School Shop

vol. XIII no. 10

JUNE 1954

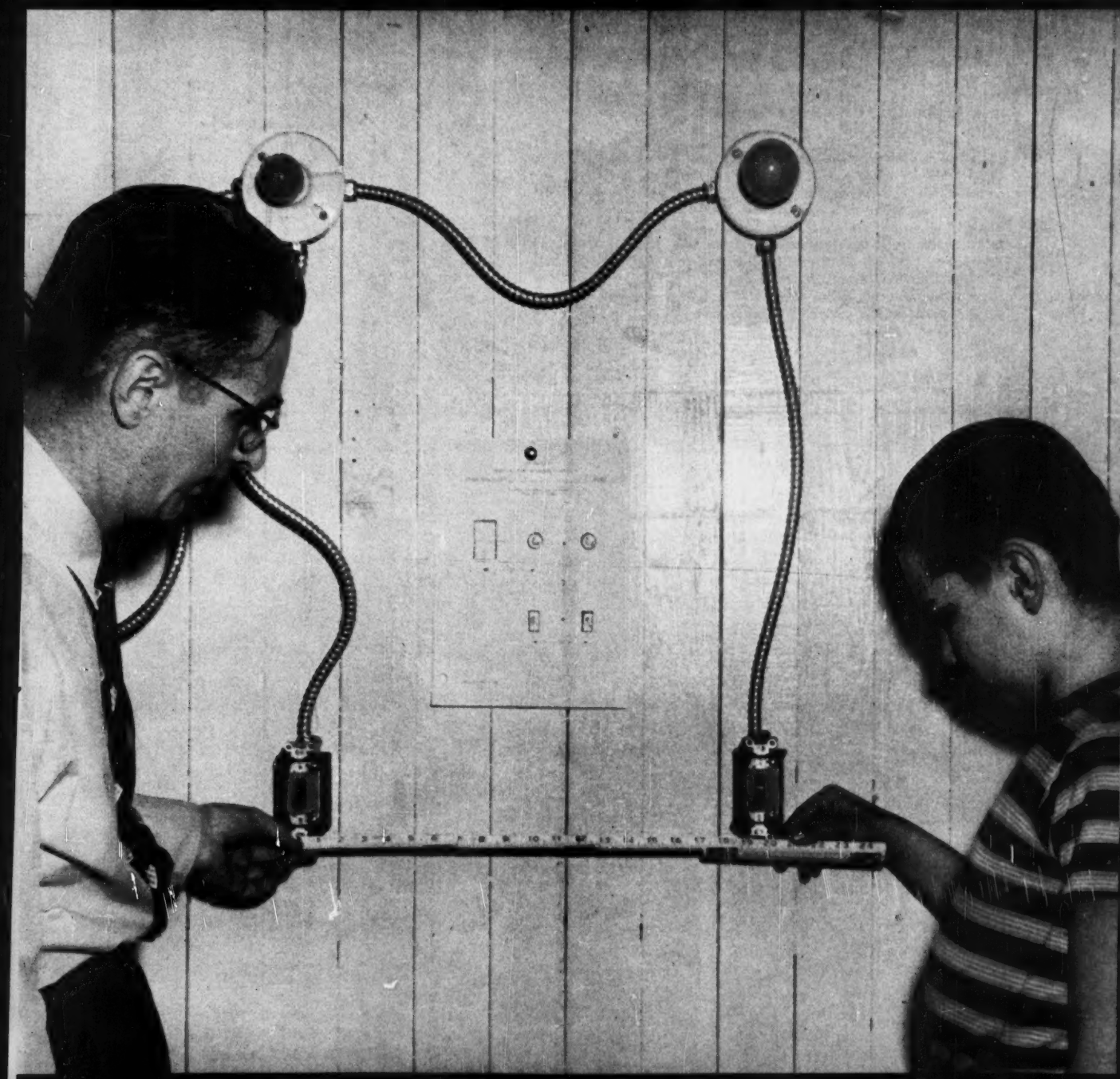
Summer Vacation Plus
by Milton E. Larson

Demonstration Two-Speed Induction Motor
by J. C. Comer

Combination Lock
by Carl Cummins

Objective Testing of Shop Projects
by Charles A. Moore, Jr.

Student in the State Agricultural and Industrial School, Industry, N.Y., testing his work in electrical wiring. For a description of this method of self testing see page 13.



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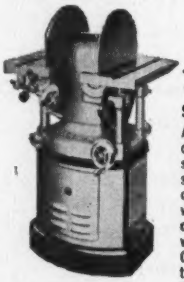

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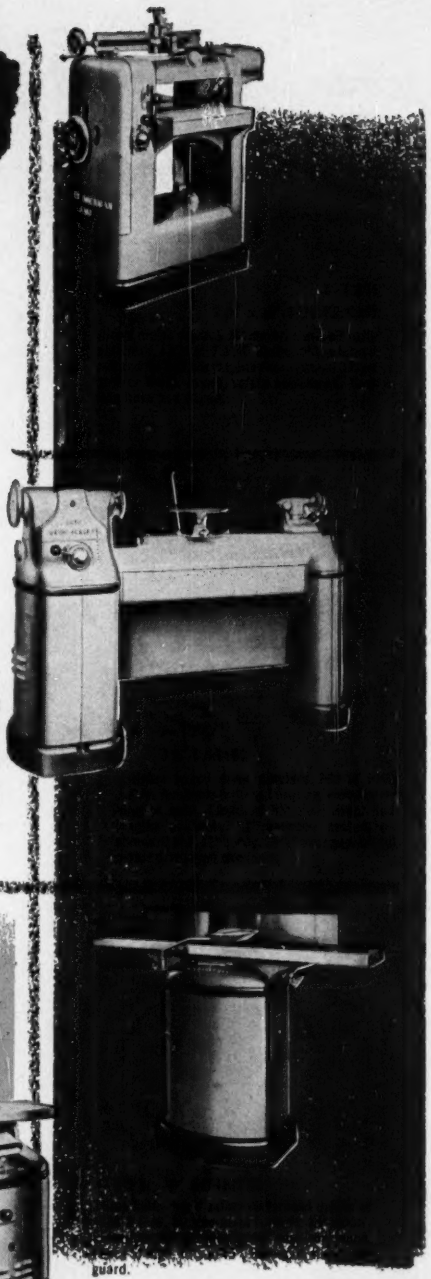

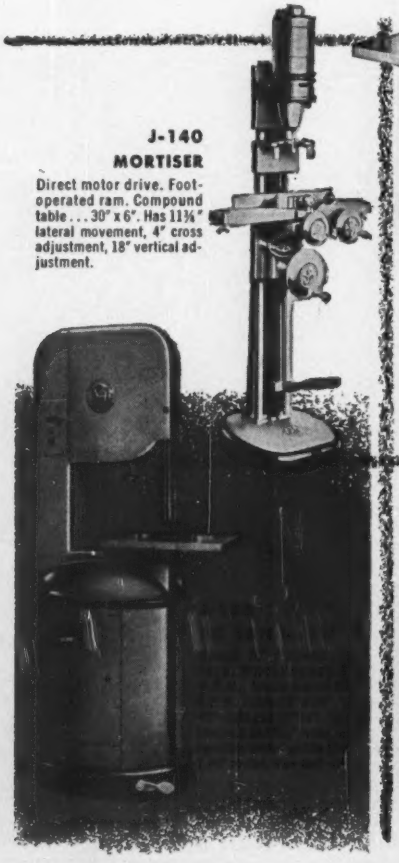

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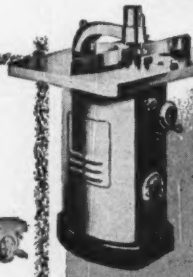

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School Shop

THE MAGAZINE FOR TEACHERS OF INDUSTRIAL EDUCATION

Vol. XIII, No. 10 JUNE 1954

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EPA

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School Shop TALK

COMMENTS ON ISSUES FACING INDUSTRIAL EDUCATION

"Proceed with Caution"

THE administration in Washington has proposed brand-new legislation covering grants to the states for vocational education. SCHOOL SHOP's Washington correspondent has a dispatch on page 40 of this issue which summarizes the legislation and gives its background.

Careful perusal of the legislation leads SCHOOL SHOP to warn its readers to "proceed with caution" before supporting the new proposals. While the likelihood is small of the legislation being seriously considered or passed at this session of Congress, people in vocational education should know what is going on and be fully prepared to take a stand if and when the administration and Congressional leaders give the legislation a full head of steam.

The proposals are contained in Senate Bill 3271 which was introduced by Senator Smith of New Jersey to "provide that federal funds be distributed for three purposes—support, extension and improvement, and special projects."

On the plus side of the ledger there seem to be three aspects of the bill which would help meet some of the criticism of the Smith-Hughes and George-Barden Acts.

First, the states (and the local communities, by inference) would have freedom to make use of funds for whatever types of vocational-education programs they deem appropriate. No rules would be made for spending a specified portion on T & I, agriculture, etc.

Second, distribution of the federal funds would be made on the basis of need through a formula which would give the states with less taxable wealth a greater proportion of the money.

Third, the "special projects" section of the bill would make it possible for agencies within a state to carry on research and demonstration projects which could be of value to the profession generally. This would be particularly true of needed research.

Now, let's look for a moment at the other side of the coin.

There are some obvious disadvantages to this bill which could seriously cripple vocational education, in our humble opinion.

First, there is no permanent appropriation for vocational education such as is now found in the Smith-Hughes Act. An annual tussle would go on each Congressional session to try to get as much of the $36 million appropriated as possible. The experience with the George-Barden Act shows what could happen. It is even conceivable that an economy-minded Congress could fail to appropriate any money for vocational education. The uncertainty of the grants would make it impossible for state and local authorities to engage in long-time planning.

Second, control by the commissioner of education over funds for the extension and improvement of vocational education and over the special projects provided for would mean that the attitude of the commissioner and of the secretary of health, education, and welfare would be of paramount importance. Unfriendly individuals in these positions could mean little action on these fronts. If the commissioner, in his wisdom, took a dim view of a proposal, the state would have to engage in a flood of correspondence and might be compelled to send a representative to Washington to defend its proposal.

Third, conceivably there could be a conflict of interests within a state over which of the vocational-education services would get the funds available. Predominantly agricultural or industrial states might not have a problem but where both are important it could lead to a serious conflict. When homemaking is added to these, a three-sided intramural battle might be joined.

Finally, the way is open for federal domination of some aspects of the program with the commissioner sitting in final judgment. Of course, the commissioner's interpretation of the action proposed under a state plan is subject to review by the courts if a state feels so disposed. Nevertheless, approval of the commissioner is needed often enough to make federal domination a distinct possibility.

While most progress is achieved through change, we have had smooth-working federal legislation for the promotion of vocational education for nearly 40 years. The potential danger in portions of these proposed changes leads us to warn our readers to "proceed with caution." ★

STANLEY SHOP TALK

No. 40

No. 50

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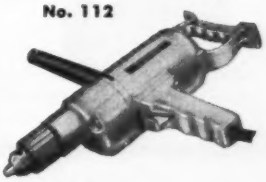

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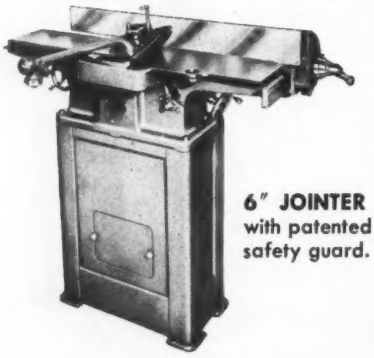

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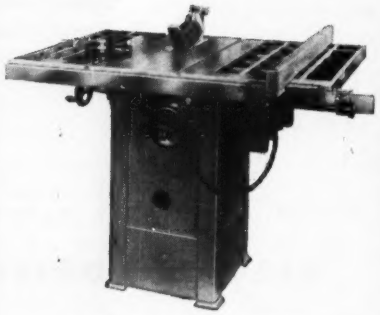

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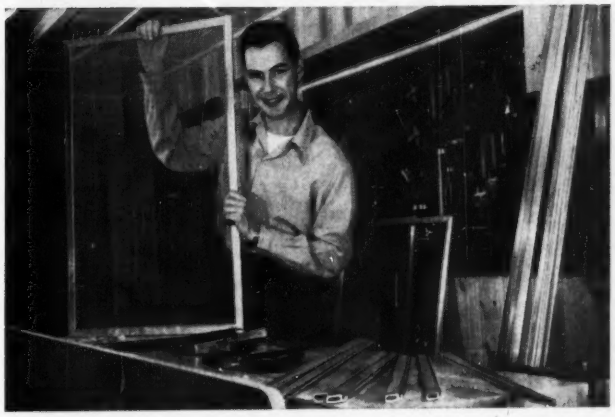

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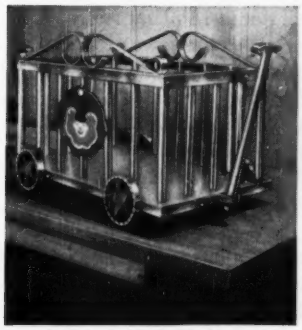

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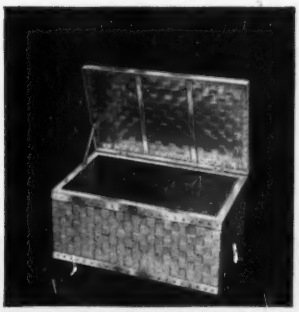

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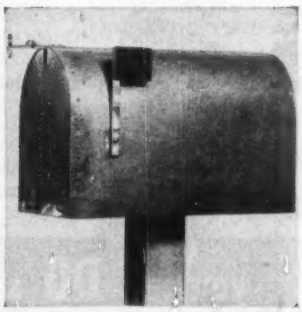

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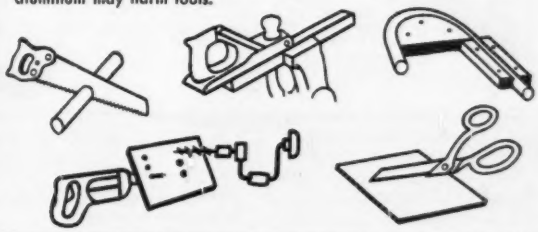

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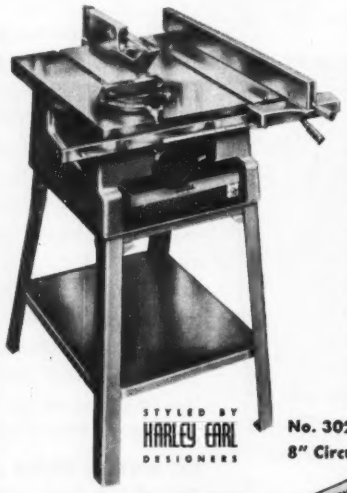

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Machine-Shop and General Subjects Instructor,
Dunwoody Industrial Institute, Minneapolis, Minnesota

MY tool box had been dusted off! With a new machinist's apron, rolled up sleeves, and safety glasses in place, I was ready for work five minutes before the whistle blew!

You see, this was my time to work in industry under the Dunwoody instructor-improvement plan.

Dunwoody Industrial Institute is an endowed, nonprofit trade and industrial school located at Minneapolis, Minnesota.

As an instructor at Dunwoody it has been my good fortune to participate in the plan for instructor improvement which is scheduled during each summer close-down period.

This was my summer to work in industry! For some time I had felt the need of returning to the trade which had been my source of income for several years. While my years of teaching had opened my eyes to a new concept of the trade, I knew that I had become rusty as far as certain aspects of the machinist's work was concerned.

Teaching the trade and doing the work in a shop on a production or on a job-shop basis are two different approaches. To meet the standards of speed and accuracy of a highly efficient job shop was a real challenge. Through the patient understanding of a competent foreman, I soon adjusted to the requirements of the shop and was turning out accurate parts for complicated machines. But, more important to me, I was acquiring once more the feel of meeting and solving shop problems in the same way that industry solves them! This would make my teaching more realistic. I faced, again, the task of actually turning out a finished product that would pass rigid inspection in the time allotted. As a result, I knew my teaching next year would be improved through these industrial experiences.

Industry Was Different!

Things were different than they had been eight years before! The shop with its newer machines and more modern equipment made me realize that industry was progressing rapidly. How glad I was that I could actually spend a few weeks again in a modern, progressive shop—my students would benefit by my experience.

Even though I was still an employee of Dunwoody, working on a pay basis of 12 months, I was ready for payday when it arrived. It meant an added pay check because under the Dunwoody plan I was permitted to keep any check from industry in addition to my regular salary. It is suggested that the extra money earned be saved and used to defray the expenses of additional professional or technical education in later years.

The Dunwoody plan is a three-fold plan for instructor improvement which calls for three possible activities which may be rotated over a three-year period. One year an instructor may secure employment in industry in work that will be beneficial to him and the instruction of his department. A second year is devoted to professional or technical education for the four-week period following vacation time. Since this is scheduled on school time it must be in courses or special training with prior approval of the school. Often it is necessary to arrange a fifth or sixth week for schooling by using part of the vacation time.

Dunwoody provides four weeks of paid vacation for instructors having four years or more of service. (During the first and second year it provides two weeks and during a third year three weeks of vacation.) Under the instructor improvement plan during a third year the instructor is on duty in his department for the four-week period following his vacation time. He works at writing and revising lesson materials, or improving teaching aids or devices. Sometimes he assists with the installation and repair of equipment in the department or in the building. This gives him an opportunity to prepare and bring up to date the training stations and instructional materials for his courses and students.

I am proud of the opportunity of participating in all of the phases of the Dunwoody plan for instructor improvement. It has helped me!

Labor laws, social security, union organization, business organizations, bookkeeping and accounting and many similar phases of business administration have been covered in the curriculum I pursued in earning a business administration degree at the University of Minnesota. These might well be considered as needed related and helpful general subjects for the tradesman, because many tradesmen today are in business! Others profit from a broader understanding and appreciation of the close connection between trades, industry, and business. I completed part of the requirements for my BBA degree during the summer close-down period under the Dunwoody plan. Going to summer school is work! But it is better to go to school on a regular salary than without it. The Dunwoody plan helped provide incentive for me to spend hours poring over textbooks during the hot days of Minnesota July weather, when I would rather have been on the lake fishing!

Another Summer Assignment

Moving lathes, milling machines, grinders, and other machine tools is hard work. Planning an improved layout for a machine shop that already was quite well planned is a challenge! But that was the assignment for three of us for the close-down period last year. Previous contacts with industry, understanding of the needs of the shop, and the requirements of good organization together with the many short conferences with the supervisory and administrative staff produced results that have brought forth many comments of praise and, to my knowledge, no adverse remarks. While we were reorganizing the machine shop, other instructors were writing and revising lesson materials, checking supplies, and rebuilding instructional aids and devices—all efforts directed towards making a good teaching situation better!

While I have reviewed my own experiences under the Dunwoody plan, I know that other members of the staff are equally enthusiastic over the opportunities it made available to them.

Each summer if you could visit with members of the staff, you would find them working in many trades. For in-

(*Continued on page* 15)

An ingenious, student-made, prize-winning

Demonstration Two-Speed Induction Motor

By J. C. Comer

Cass Technical High School, Detroit, Michigan

THIS student-made demonstration electrical motor shows clearly how changes in speed may be achieved by changing the number of poles. An ingenious arrangement of leads to a plate on the outside of the motor helps the instructor to demonstrate to the student the theory behind this operation.

The motor described here is a three-phase, two-speed, squirrel-cage induction motor adapted from a war-surplus ½-hp motor. It was built by John Ugo, a senior at Cass Technical High School, Detroit, Michigan, and won first prize in the Ford Industrial Arts Awards last year.

With the squirrel-cage induction motor any change in speed must be made by changing the number of poles or the frequency. The former is the practical method, of course, because changing the frequency would involve expensive frequency-changing equipment and some method of changing the conductors per path, per phase simultaneously.

Two speeds were obtained in early induction motors by employing two separate windings in the stator. The modern two-speed induction motor, however, does not employ two separate windings. The two speeds are obtained from one winding which is arranged to give two different numbers of poles. By external manipulation of the leads, the polarity is changed from "salient" to "consequent."

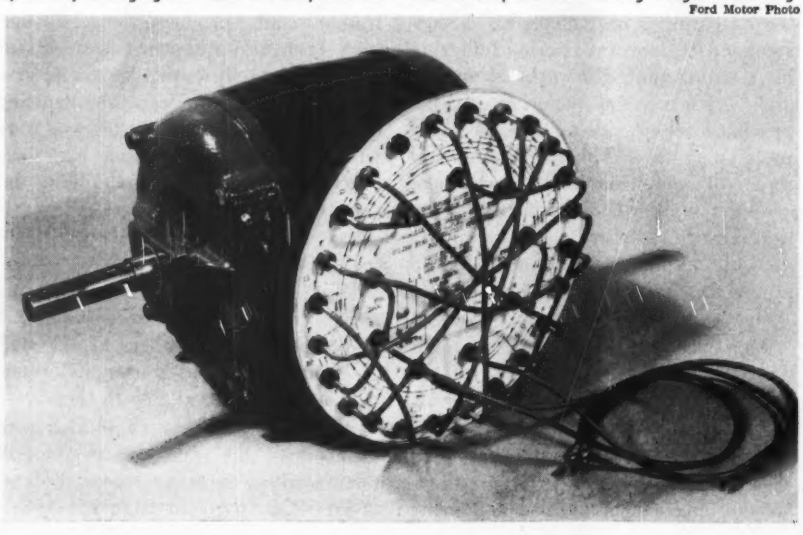
The difference between salient and consequent poles is that the salient pole connection gives one magnetizing pole per phase for each group of coils while the consequent pole connection gives two. By arranging a winding so that the polarity can be changed from salient to consequent, or vice versa, a change in poles is affected and two speeds result. All standard induction motor connections are of the salient type and, of course, give one speed.

Plan of Procedure

1. The old winding was stripped from the stator.
2. The core dimensions were recorded for use in designing the new winding.
3. The slots were insulated.
4. New coils were placed in the core.
5. Coils were connected in pole groups.
6. The start and finish ends of the pole groups were connected to #16 wire extra flexible leads.
7. Retaining wedges were placed over slots.
8. Winding was tested for electrical defects (short circuits, open circuits, grounds, and reversed coils).
9. Winding was sprayed with high-grade insulating varnish.
10. Twenty-four 3/16" holes were drilled equidistantly in the end bell opposite the pulley end of the motor.
11. The start and finish ends of the pole groups were brought out through the holes referred to in step 10 when the motor was assembled.
12. A clear ½" plastic disc, 1' in diameter, with the diagram of the pole groups drawn on a piece of paper and cemented to its back, was mounted on the motor where the leads came out.
13. The start and finish ends of the 12 pole groups were fastened to the jacks.
14. A set of flexible jumpers with pin jacks fastened to both ends were made up for connecting purposes.

The two speeds, 900 and 1800 rpm, were demonstrated by making the prescribed external connections to the line.

Leads from the poles inside the motor make it possible to demonstrate changes in motor speed by changing the number of poles on the external plate with wiring diagram showing.
Ford Motor Photo



Computation of Winding Data

The stator has 35 slots (Wss. .375; Dss. .625), a bore diameter of 4.625, length of 2.75, tooth width of .1875, and .75 of iron below the teeth. The squirrel-cage rotor winding was intact. The winding selected for the stator was lap for four-pole salient and eight-pole consequent, the salient 1800-rpm winding to be two parallel-star for four poles and the consequent 900-rpm winding series-star for eight poles. The tabulated winding data follows:

Three-phase; distributed; lap. Two-speed, 900 and 1800 rpm. Four-pole, salient; two parallel star. Eight-pole consequent-series star.

1. C.S. $= \frac{\text{Slots}}{P} + 1 = \frac{36}{8} + 1 = 5\frac{1}{2}$ or *1 & 6.*

2. Coils = Slots = *36.*

3. Groups = P × Phases = 4 × 3 = *12.*

4. Coils per Group $= \frac{\text{Coils}}{\text{Groups}} = \frac{36}{12} = 3.$

NOTE: In line with the requirements, the coil span was computed using the larger number of poles. The groups were computed using the smaller number of poles. The selection of two parallel-star for the four-pole, 1800-rpm winding and series-star for the eight-pole, 900-rpm winding keeps the counter emf the same at both speeds.

The design of the winding consists of 20 individual steps. However, only the essential steps will be given for the sake of brevity. These steps cover the total number of conductors, the turns per coil, and the size of the wire.

Total number of conductors (Z):

1. $Z = \frac{E \times 10^8 \times 60 \times N_c \times 3}{rpm \times \Phi_t \times K_1 \times K_2 \times \sqrt{3}}$

$= \frac{240 \times 100{,}000{,}000 \times 60 \times 2 \times 3}{1800 \times 1{,}511{,}200 \times .665 \times .76 \times 1.73}$

$= 3600$ conductors.

a. $\Phi_t = D \times \pi \times L \times FD_g$

$= 4.375 \times 3.14 \times 2.75 \times 40{,}000$

$= 1{,}511{,}200$ lines of force.

Turns per coil (T):

2. $T = \frac{Z}{\text{Coils} \times Z} = \frac{3600}{36 \times 2} = 50$ turn.

Size of wire *(CM)*:

3. $C.M. = \frac{W \times C.M./Amp.}{\frac{E \times Pf. \times Eff. \times N_c \times \sqrt{3}}{373 \times 410}}$

$= \frac{240 \times .75 \times .71 \times 2 \times 1.73}{}$

$= 600$ C.M. = No. 22.

NOTE: Before accepting the turns per coil of a certain size of wire from the design equations, it is necessary to check the following factors rigidly: (1) Flux densities in all parts of the motor. This includes the tooth density and the iron below the teeth. (2) The impedance of the winding which determines the current flow at no load and full load. Changes are sometimes necessary in wire size to make this adjustment satisfactorily.

Symbols:

Z = total number of conductors.
N_c = number of circuits per phase.
E = line voltage.
rpm = revolutions per minute.
Φ_t = total flux threading through motor.
K_1 = distribution factor (.665) constant.
K_2 = chord factor = 1 for full pitch.
= sine of ½ the angle spanned by the coil for chorded coils. Coil spans 100°.

$\frac{100°}{2} = 50°$. Sine = .76.

D = diameter of stator bore.
L = length of stator.
FD_g = flux density in the air-gap (25,000 to 45,000 lines per square inch).
T = turns per coil.
C.M. = cross-section of wire in circular mils.
C.M./amp. = allowable C.M. for each ampere flowing in wire (from design table).
Pf. = power factor (from table).
Eff. = efficiency (from table).

As stated previously, these three steps comprise only the bare essentials of design. A summary, however, shows that the coils were wound with 50 turns of No. 22 Formex wire.

The diagram used at the bench for interconnecting the pole groups of the three phases is constructed by following a specially arranged schematic sketch. This sketch has to be so arranged that the voltage and current per turn, per coil, per group, per path, and per phase remains the same when the motor is operating at either speed. Unless this prearrangement is considered, all the basic design factors such as tooth density, flux density in the air-gap, circular mils per ampere, etc., will change. This, of course, will affect the power output, torque, and efficiency.

This specially arranged schematic sketch follows:

FIG. A

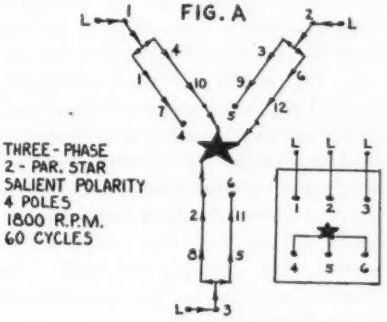


Figure B is a shop diagram constructed according to the schematic sketch Figure A. Notice that the current, flowing from the line leads into the motor leads 1, 2, and 3, splits and forms two paths through the phases. This is salient current and is connected to the pole groups so that they form salient poles. Salient poles are alternate. That is, the current reverses instantaneously on adjacent pole groups. Each pole group establishes one magnetic pole. By tracing this salient current through the three phases, using Figure A as a guide, the salient polarity of the pole-groups is readily observed.

Figure C is a reconstructed schematic sketch of Figure A. Compare Figures A and C. If in Figure A we moved motor leads 4 up to the left, 5 up to the right, and 6 straight down, we would have constructed Figure C without breaking a connection. The winding then becomes series star, the polarity consequent; thereby doubling the number of poles with the speed dropping to 900 rpm. This is accomplished, in a practical way, by simply making external changes in the motor leads 1-2-3-4-5-6. For the four pole, two parallel star, salient connection, the line leads are brought into motor leads 1-2-3 and 4-5-6 are connected together. For the eight-pole, series star, consequent connection, the line leads are changed to 4-5-6 and 1-2-3 are left unconnected.

FIG. C

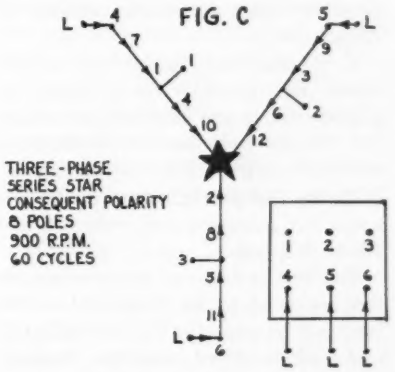


Figure D is a shop diagram that is a duplicate of Figure B. The only difference is that the consequent current is traced through the phases by following Figure C and placing the consequent polarity on the pole-groups. Notice now that polarity does not alternate as it does for salient polarity, but is the same for all groups. So, although Figures B and D are exactly the same diagrams, they can be changed from salient to consequent, from two-parallel star to

FIG. B

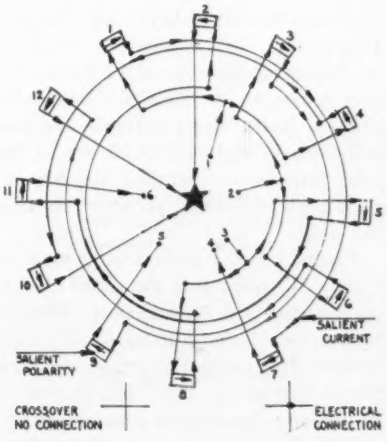
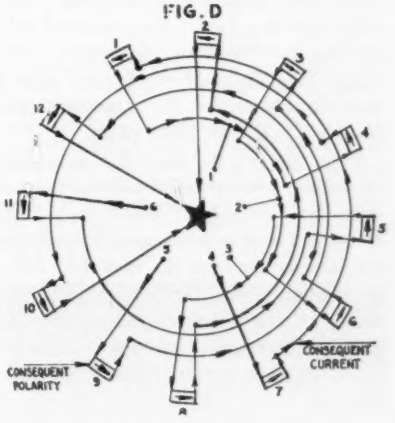


FIG. D



series star, or vice versa, by simply making external changes in the motor leads coming from the winding. Then, as already explained, the poles double or halve giving the two speeds.

Technical information regarding the two-speed induction motor, using the principle of salient and consequent polarity, is rather meager. It is necessary, therefore, to compile a list of the requirements that must be followed rigidly for its development. We will then take each important requirement and illustrate the principle and its application.

Two-Speed Motor Requirements

1. Both salient and consequent poles must be employed.

2. The coil-span must be chorded 30 percent to 50 percent. This is done by using the larger number of poles in computing the coil-span.

3. The number of pole-groups is computed by using the smaller number of poles.

4. Six leads are brought out of the stator. This provides for a change in polarity. They are labelled 1-2-3-4-5-6.

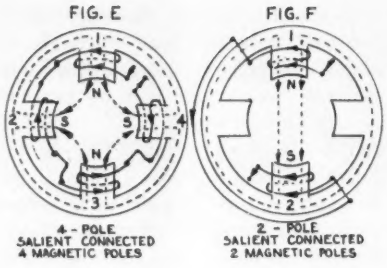
5. Proper selection of connections must be made (series to two-parallel, Delta to two-parallel star, etc.) This keeps the generated back emf constant for both speeds.

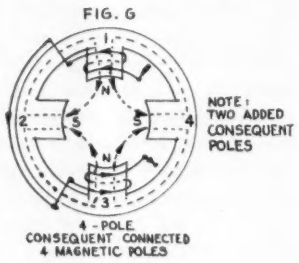
The first and second requirements on the list need to be illustrated if the learner is to grasp the fundamental principles of two-speed windings. Requirements three, four, and five are adequately shown in the computation of the winding data.

Salient and Consequent Polarity

To explain this phenomena, we can resort to a direct-current analogy. Suppose we have three direct-current motor frames of exact mechanical dimensions which have four field poles. We will call them Figures E, F, and G. Figure E is the conventional type of four-pole salient connection and produces four magnetic poles. Figure F is the same frame with only two field coils connected salient and produces two magnetic poles. Figure G is the same as Figure F except that the connection is consequent and produces four magnetic poles.

Here we see the law of the magnet operating. Like poles repel. So to produce two and four poles from this frame, all that is necessary is to change the jumper between the two field coils. By changing this jumper, the polarity changes from salient to consequent and doubles the number of magnetic poles. An inspection of the figures will bear this out.





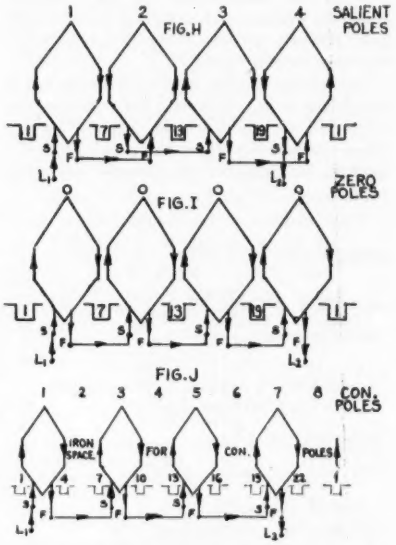
Coil-Span Must Be Chorded

Another requirement for two-speed induction motor connections is that the coils be chorded 30 percent to 50 percent. This means that, when calculating the coil-span, the number of poles used in the coil-span equation is the larger of the combination. If full-pitch coils are used, that is, the smaller number of poles of the combination, zero magnetization will result for the consequent connection. By chording the coils, iron space is provided for the establishment of the additional poles.

Consider the winding data of this example. The number of slots is 24. The pole combination to obtain the two speeds is four and eight. If the coil-span is computed using the four poles, the coil span will be (Slots÷P) + 1 or (24 ÷ 4) + 1=7. This means that the two sides of the coil will lay in slots 1 and 7. This is full-pitch for the four poles.

Figures H and I illustrate the use of full pitch for the four poles. Each coil represents a pole-group in a phase. Figure H is connected in the conventional salient manner, using the finish-to-finish and start-to-start relationship between pole groups. This connection results in an instantaneous reversal of the excitation current in adjacent successive groups. Notice the current in the two coil-sides in slots 1-7-13-19 are in the same direction so that their magnetic effects are additive and produce four salient poles.

Figure I is the same arrangement as Figure H except that the connection is consequent. The relationship between pole groups is finish-to-start and finish-to-start. This connection causes the excitation current to flow instantaneously in the same direction in adjacent successive pole groups. Notice that the current in the two coil-sides in slots 1-7-13-19 oppose each other. This results in the complete neutralization of the magnetic effect of each pole group, producing no poles. If the coil-span had been computed on a basis of the larger number of poles (Slots ÷ P) + 1=(24 ÷ 8) + 1=4 or 1 and 4, consequent poles result. As previously stated, this provides the necessary iron space for the establishment of the consequent poles. A visual inspection of Figure J will support this theory.



In developing this project, the student has a chance to see the application of the laws that govern the science of electricity. He has ample opportunity to see theory put into practice by combining the "knowing" and "doing" units of instruction. Then too, the school benefits by having a device that can quickly and easily demonstrate the two-speed induction motor.

Throughout the development of the project, the student applies Ohm's law, power law, Kirchhoff's laws, the law of the magnet, the law of current attraction, and the law of induction. Also he will develop a plan of procedure that will allow him to move along at a maximum rate. The climax, of course, is the personal satisfaction obtained when the motor is assembled and the demonstration of the two speeds takes place. ★

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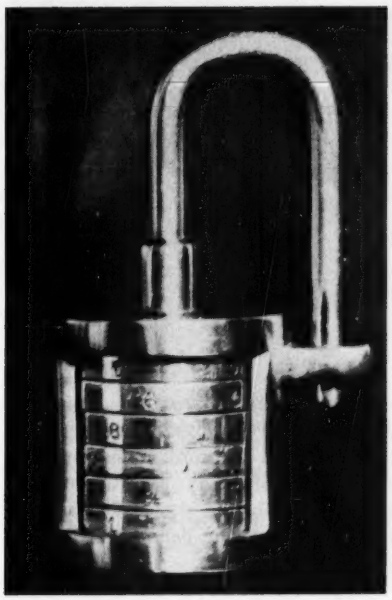


Above: This barrel-type combination lock is an appealing project for both beginning and advanced students. It offers a great number of learning skills but is relatively simple to make.

As fascinating as a puzzle— Practical and worthwhile, too

Combination Lock

By Carl C. Cummins

Former Instructor, San Diego, Calif., High School;
Now Professor of Industrial Arts, San Diego State College

IF you are looking for a project for the general metal shop that ranks high in student appeal, possesses an unusually great number of learning skills, is extremely functional, and still may be made by the beginner as well as the advanced student, here it is!

This combination lock is designed on the barrel principle to simplify its construction and make it basically a lathe project. There are, however, many bench operations which also provide a wonderful opportunity to concentrate on hand-tool operations. The procedure is relatively simple since there are no close tolerances. An added attraction is the fact that the entire project may be constructed from scrap materials.

The complete lock may be broken down into six separate steps in order to construct the three basic parts: the barrel, the discs, and the staple. Following is a list of tools and materials needed to perform the job:

Machine Tools: Lathe, drill press, grinder.

Hand Tools: 6" steel rule, pipe cutter, hacksaw, inside and outside calipers, hammer, center punch, scriber, cold chisel, mill file, file card, drill (No. 40), abrasive cloth, soldering copper, soldering furnace, and oxy-acetylene welder.

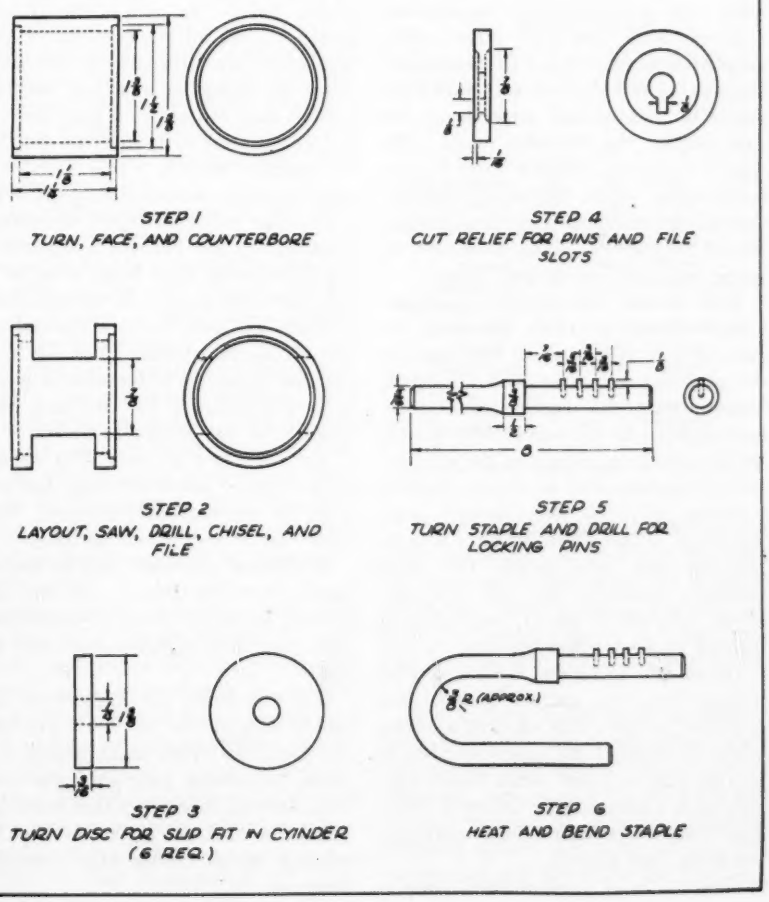
Materials:

Galvanized iron pipe (1¼")
Duraluminum plate (3/16")
Sheet steel (1/16")
Cold-rolled steel (⅜" round)
Nail (6d)
Hexagonal nut (5/16")

From the sketches shown it will be seen that in Step 1 the barrel should be turned, bored, faced, and counterbored.

(*Continued on page* 33)

Below: The lock consists of three basic parts: the barrel, the discs, and the staple. The construction of these parts is shown here in six steps.


STEP 1
TURN, FACE, AND COUNTERBORE
STEP 4
CUT RELIEF FOR PINS AND FILE SLOTS
STEP 2
LAYOUT, SAW, DRILL, CHISEL, AND FILE
STEP 5
TURN STAPLE AND DRILL FOR LOCKING PINS
STEP 3
TURN DISC FOR SLIP FIT IN CYINDER (6 REQ.)
STEP 6
HEAT AND BEND STAPLE

Making an enlarged demonstration model (such as shown below) before the combination lock is built provides a worthwhile learning experience for the students. The model also can be used for display purposes later to interest other students in the project. This model differs slightly from the lock shown above. It has only four numbered discs, instead of six, the wooden end discs are larger proportionately than the steel end plates in the lock, and the turn staple has only three locking pins instead of four.

Just to Be a "Good Guy," Do You Let Them

Work a Good Horse to Death?

By R. Paul Lightle
James H. Smart School, Fort Wayne, Indiana

LET'S ask Jigsaw Jones, the shop teacher. He'll be glad to do it!"

These words, spoken daily in schools all over the country, seem to be the bane of the shop teacher's life!

Whether it refers to building stage props for a forthcoming production, minor repairs to the building, or constructing school furniture, this very real and frustrating situation often puts the shop teacher "over the barrel."

If he agrees to work on the job, generally against a deadline, he often puts in many long hours that could otherwise be spent doing his regular job. If he refuses, tactfully, of course, he is quite often labeled "uncooperative" by the faculty member making the request.

An illustration of what sometimes happens is that brought to light during a recent gathering of shop teachers. One of the group told how he was cutting short his vacation in order to return to school a week early to build some tables for the school. He chose to put in the extra time rather than disrupt his regular teaching plan. And his case is certainly not unusual.

Often the request for help in such a project comes from a fellow-teacher who prefaces his remark with, "If you have some boy with nothing to do," or "If you have a pupil who cannot buy his materials, I have a job he could work on." They fail to realize that the youngsters enjoy making something they can take home . . . something that is theirs to keep . . . a product of their creativity.

As a shop teacher, what should you do?

Should you drop everything, forget your teaching duties and be a maintenance man for the next few minutes, hours, days, or whatever time is necessary to finish the job? Should class time be forfeited to do the work?

How can you reach a fair decision?

Perhaps, many times burned, you have swung to the extreme and turn down all jobs—on the other hand, afraid you'll be labeled "uncooperative," you may lean too much in the other direction and put in many hours doing everything that is asked of you.

And no specific answer is always applicable to all situations. Instead, a decision must be reached that is fair to the pupil, school, and teacher alike.

Here are a few of the possible solutions, summarized to help you clarify your thinking on this issue.

You can:

Give a flat refusal. You will soon be labeled as noncooperative by fellow-teachers and administration alike, but you *are* justified in saying no on occasion, otherwise the school shop may cease to be a classroom and instead develop into a maintenance department.

Accept such jobs only after you've weighed their importance in your teaching plan. If well-planned, such jobs offer practical, educational experience for your pupils. On the other hand, jobs carried to excess, which DO NOT fit into instructional plans, represent exploitation of the students. The shop teacher should reserve the right to accept or reject each job on its own merit.

Have certain boys assigned from advanced classes to work primarily on such jobs as they come in. Let them do the planning as far as it is advisable, thus relieving the teacher of some responsibility. At the same time, pupils get practical experience in the application of fundamentals previously studied.

Screen all such jobs through your principal. If the administration is sympathetic and understands the shop teacher's problems, he will eliminate trivial jobs which are so frequently requested by your fellow-teachers.

Do all jobs presented. With a class of average size, this attitude cannot generally be justified if an efficient teaching job is expected by the supervisor, but in private schools where small classes prevail, such a plan may be followed. However, long-range instructional planning would be very difficult.

Have a brief, well-planned professional orientation discussion of your department with other teachers. Help them to understand the aims, objectives, and the course of study used in various industrial-education classes. It may lead them to view your department with a different perspective.

Require a sketch for any construction job before accepting it. This helps avoid misunderstandings and often brings to light the fact that the so-called little job may have gigantic problems as far as construction difficulty is concerned. A sketch may reveal the impracticality of the proposed job, or it may enable you to simplify or improve the plan.

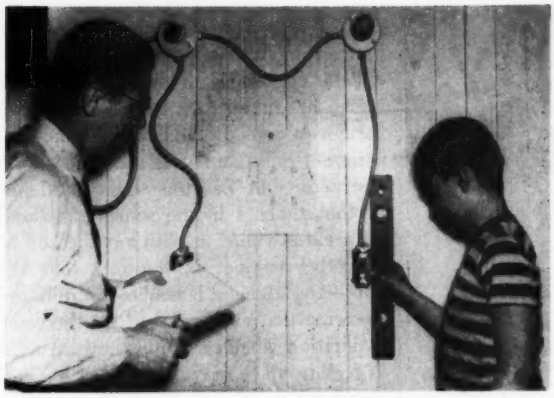
Give the "treatment." In this case, the "treatment" is usually a long waiting period before the job is finally completed. As we all know, many of your headaches are dreamed up overnight. After accepting such a job, carefully explain that you are very busy and cannot promise the early delivery date that is urgently needed. (This solution is used by many successful shop teachers.)

Exercise judgment before accepting a construction job. Perhaps it fits into the vocational-shop class better than in the industrial-arts group. In industrial-arts, students are likely to be engrossed in a project for their personal use. But in vocational class, one of the aims is to provide opportunities for teaching skills peculiar to that particular trade.

Keep a diary or record of what is done on every job of this type. List your time, the value of materials used. These facts can be very handy at times.

Additional problems may be encountered where the school pays an extra amount above the yearly salary for such jobs, and none of these arguments may apply.

But remember, the suggestions presented here do not set forth any hard-and-fast rule which is absolutely foolproof for solving your particular problems. Instead, it is hoped that from these you'll be able to arrive at the best solution which covers your particular situation. ★



Students can help with the objective testing of shop projects. Here a student is measuring the plumb and level tolerances on a cable job project in electricity. The instructor rates the student on a chart.

An interesting, profitable experience for both instructor and student

Objective Testing of Shop Projects

By C. A. Moore, Jr.

Vocational Supervisor,
New York State Agricultural and Industrial School,
Industry, Monroe County, New York

OBJECTIVE testing has been used extensively by teachers of academic subjects, and, in the area of related theory, by shop men. The advantages and disadvantages of true-and-false, multiple-choice, short-answer, and other forms are well known. The use of similar techniques in the grading of shop projects is a field worth consideration.

Objective testing can be a series of enjoyable experiences for both the instructor and his students. The instructor can have a number of scores, backed up with evidence, by which he can give a report-card mark without any guessing. He can see his students make progress in areas of his course where they have hitherto lagged. He can derive much satisfaction from experimenting with changes.

The student, by the use of this technique, has his errors pointed out, and measured. He has a stimulus to improve his score on the next project. He has the satisfaction of seeing the instructor take the time necessary to evaluate each part of his job, instead of looking it over quickly, pointing out mistakes, then assigning the next task. This is particularly valuable in activities like electricity, plumbing, or bricklaying, where much of the work is of a transitory nature; i.e., each project is assembled, checked, then torn down to make room for the next.

Setting up an objective rating scale can be a fairly simple job, and the scale can be modified or enlarged as the individual instructor evaluates his results. The writer developed a plan for grading electrical wiring jobs by picking out the significant parts of a series of projects determining the tolerances to be allowed full credit, and placing values on other dimensions and items.

This can best be explained by reference to one of the charts used (see chart below). It was drawn with a ball-point pen and India ink on a file folder. In use, the student's score was written on a piece of onion skin clipped over the scale. The main divisions are listed on the left side, with column headings indicating the scores to be allowed for the items listed. For example, an error of ¼" in measurement is scored 75, two errors in wiring would get 50.

JOB RATING SCALE
ELECTRICITY

NAME
DATE

CABLE JOB NO.
SCORE

	100	75	50	25
MEASUREMENTS	⅛	¼	⅜	+⅜
PLUMB, LEVEL	-⅛	⅛	+⅛	
SECURITY				
CABLE		LOOSE	LOOSE	
BOXES		LOOSE	LOOSE	
APPARATUS			LOOSE	LOOSE
WORKABILITY				
CIRCUIT		1 ERROR	2 ERRORS	
WIRING		1 ERROR	2 ERRORS	
CONNECTIONS		WIRE NOT ON	LOOSE	
SAFETY				
SPLICES			LOOSE UNTAPED	
CONNECTIONS			BARE END OVER ¼"	

A job rating scale chart in electricity.

The cable job chart shown has five main divisions, as does the one used for grading conduit work. The principal difference between these and the one used for open wiring is that the latter has a "neatness" item in place of the "safety" item.

The student works each job from a mimeographed job sheet, which gives dimensions and layout, but no circuit diagram. One part of the student's task is the drawing of a wiring diagram showing splices and wire colors. This is checked and scored by the instructor before the student starts installing the job.

In using the scale to grade a finished project, each item is inspected *with* the student. Measurements are checked carefully, and the student invited to verify the instructor's finding. One measurement beyond the tolerance is enough to knock the score down. For example, if there were four measurements to be checked, and one was ⅜" off, the score for "measurements" would be 50, even though three others were perfect. Plumb and level tolerances are measured on a foot of length, in the case of conduit, and on the longest dimension of a box or other apparatus.

The "loose" and "insecure" items are admittedly somewhat subjective. The writer decided a unit was insecure when it was liable to fall or come apart in use. If it could be moved when shaken by ordinary use, it was considered loose. The student's grade for a project is determined by averaging the scores on the items checked.

Over a period of time the writer collected and evaluated a series of scores resulting from the use of this method. Plotting them showed a scale skewed toward the upper end, which the writer interpreted as an indication that the test standards were low. However, up to this time no evaluation had been made of the length of time taken by a student in completing a job. After correction of the scores on the basis of time, it was found that they approached a normal curve within satisfactory limits. While this was an interesting study for the writer, it is not an essential part of an objective testing procedure. It is, however, an example of the fascinating byways such a device opens up.

The advantages of a method for objectively evaluating a finished project are many. The instructor can invite a

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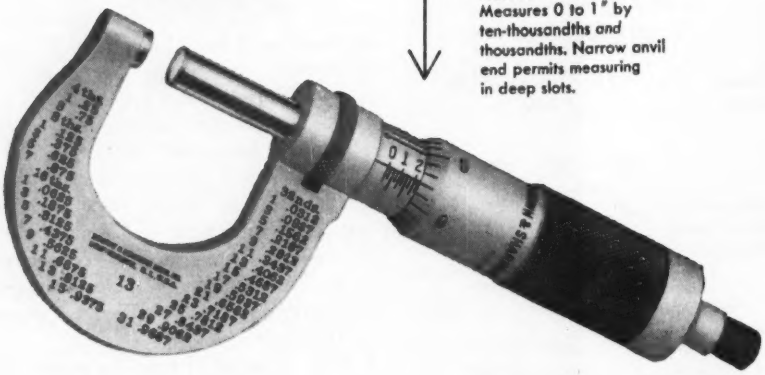
No.11RS Micrometer. Measures 0 to 1" by thousandths. Has enameled, "I" section frame . . . 3/16" anvil projection for convenience in measuring counterbores and slots.



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visiting instructor or tradesman to evaluate a job with confidence that the score will be very close to the one he would arrive at himself. Students may score their own jobs or those of one another. This not only conserves the time of the instructor but develops the confidence of the students in the scoring method. Of greatest value, as with any method of objective testing, is the fact that the subjective element is held to a minimum, assuring that each job will get the same evaluation whether or not the instructor is feeling up to par and without his personal relations with the student having any effect.

There are disadvantages in this type of testing, of course, but they are far outweighed by the benefits to be gained. The grading demands time, and it is necessary that the job be done as soon as the student has completed his project. This has a compensation in that the student appreciates the interest shown by the instructor and is spurred to a greater effort in succeeding exercises. Development of a satisfactory scale requires much thought and effort to fit it to the individual instructor's course. This pays off in requiring reevaluation of the course content, and consequent emphasis on the teaching of essential items.

The writer is indebted to two of his former colleagues, teachers of masonry and woodworking, for his introduction to this interesting activity. Their items and methods of checking were essentially the same as that described above, except that both of these men used a scale of one to four points in scoring jobs—one point for an item within the tolerance allowed, ranging to four points for a totally unsatisfactory one.

Regardless of the various types of shop activity, and the differences inherent in them, objective testing of projects can be an interesting, profitable experience. Fundamentally, the requirements are simple:

1. List the items of several jobs to be checked.

2. Pare the list to the essential items common to the several jobs.

3. Determine reasonable tolerances for those items which can be measured.

4. Write definite, concise specifications for those not measurable.

5. Assign values to the items—high ones to the items you consider most important.

6. Use it on one section of your course and see what develops. ★

Vacation Plus . . . . *from page 7*

stance, you would find some in and about new homes doing carpenter work; others surveying for new road construction; and still others repairing engines and straightening out the auto bodies in garages. Some instructors could be located working on television and radio sets and other electrical units in service shops and in industrial establishments; and still others could be seen installing and servicing heating plants and refrigeration units—to mention only a few.

Each year some are in professional and technical classes of colleges, universities, or factory-training schools. Some of the factory schools are conducted at Dunwoody, others are held in factories or in business establishments in the Twin Cities. In some instances the instructors have found it necessary to go to Detroit, St. Louis, and other more distant points for the training desired.

The Dunwoody instructor improvement plan has met with the approval of many employers who have cooperated in it. Dunwoody has received numerous commendatory responses on the plan. The instructors have been recognized for their services and contributions to cooperating companies. Good placement relationships and additional industry interest in the school have resulted.

The Dunwoody summer instructor improvement program involves a large investment of time and money on the part of the school. The administrators of the school, however, are convinced that the returns reflected in the improved training program and in the morale of the staff make it worthwhile. ★

Here Is a Way . . .

to publicize your industrial-education program

TV Shows Shopwork

INDUSTRIAL education throughout all of Iowa received publicity indirectly as a result of two TV shows given by the industrial-education department of Iowa State College last winter on the "This is Iowa State" WOI-TV program which dealt with the refinishing of furniture.

The first show emphasized the points to consider in determining what to refinish, the removing of the finish, and the bleaching of wood. The second program dealt with filling, staining, and finishing wood surfaces.

The fact that several hundred requests for information were received after the programs were aired is evidence that the shows were appreciated. ★

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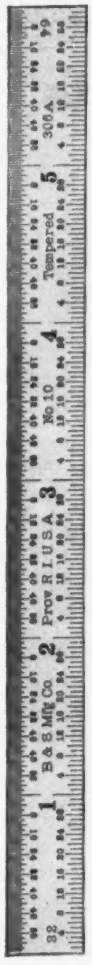
these "clean-cut" scales aid student accuracy



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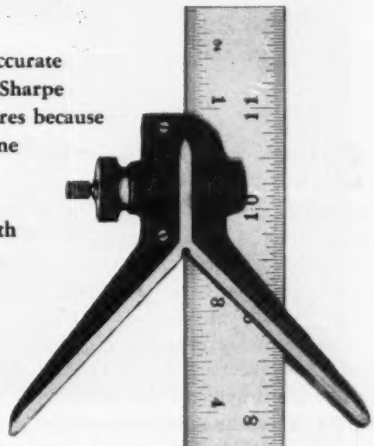
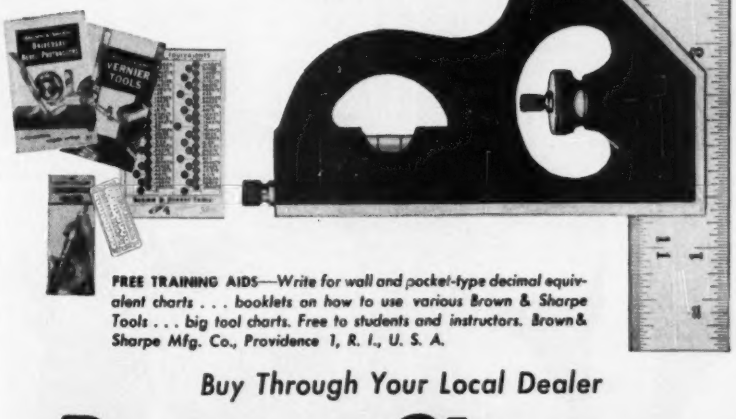


No. 306A Flexible Steel Rule graduated in 32nds and 64ths. Available with leather case if desired.



All Brown & Sharpe Combination Squares feature the exclusive reversible bolt which permits use of either side of blade. No. 402, shown at right, available with 6", 9", 12", or 24" blade.

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Try this project and see your eighth-graders "walk on air"

Aluminum-Wood Stilts

By Jules Bertin
Avonworth Union School District,
Ben Avon, Pittsburgh, Pennsylvania

STILT-MAKING is a good "boy-interest" project for the junior-high-school shop that has an aluminum foundry. It not only has boy appeal, but also involves certain principles of pattern-making and molding that make it especially suitable for use in the eighth-grade classes. Although some eighth-graders might be beyond the "stilt-age," stilts still make a welcome and durable toy for younger brothers and sisters.

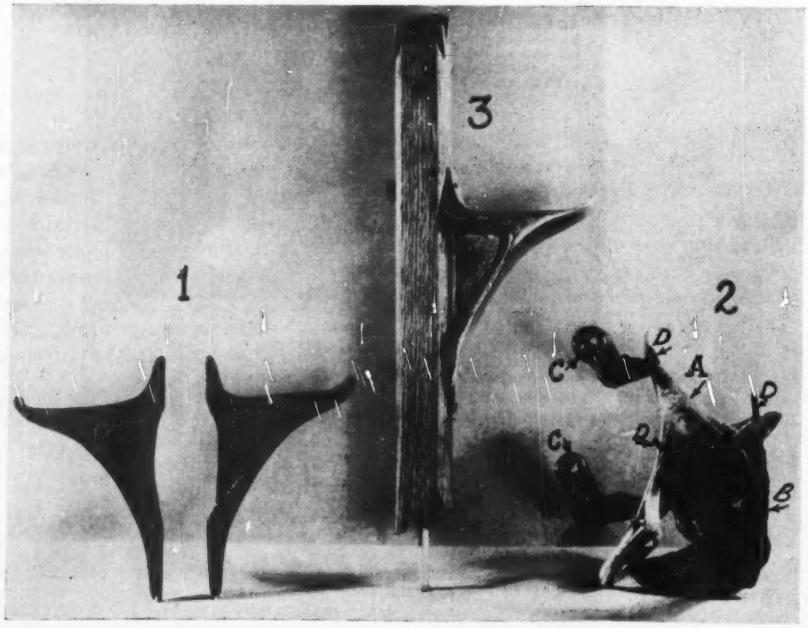
The stilts shown here have a cast aluminum foot-piece. The photograph and sketch below should furnish anyone experienced in patternmaking and foundry practice with ample information to work up patterns for use in his school shop.

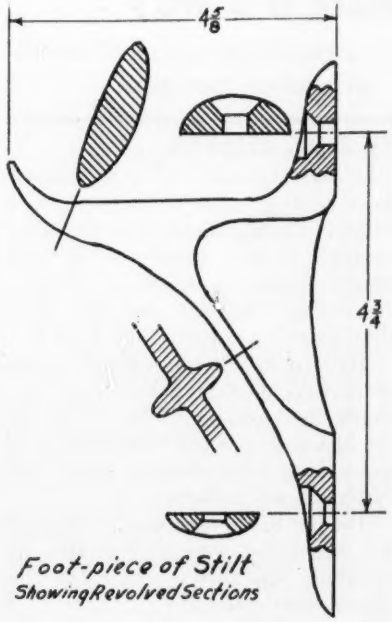
Figure 1 in the photograph below is a split (two-part) pattern of the foot-piece made of clear white pine. The web is made of ⅛" plywood.

Figure 2 is a rough casting of the aluminum foot-piece, showing *(A)* the body of the foot-piece, *(B)* sprue, *(C)* risers, and *(D)* vents. It is necessary that venting of the mold be adequate to eliminate air pockets.

Figure 3 shows the finished cast aluminum foot-piece mounted on a dummy leg. This unit is hand finished with files and abrasives. If the school shop is equipped with a milling machine or a metal shaper, the part of the foot-piece that fits against the stilt leg may be machine finished. Drill two 17/64" holes in the foot-piece on 4¾" centers. Countersink these holes for ¼" x 2¼" flat-head bolts. Brass bolts are recommended for ease in removal to adjust for greater heighth. Use lock washers under nuts to assure safe assembly.

For the stilt leg use 2" x 2" x 6' (approximately) straight-grained wood stock. Chamfer the edges, full length, and round off the ends slightly. Sandpaper smooth. Beginning approximately 8" from the bottom end of the leg, drill five 9/32" holes, 4¾" centers. Two coats of shellac are recommended to protect the wood from exposure to the elements. ★





Foot-piece of Stilt
Showing Revolved Sections

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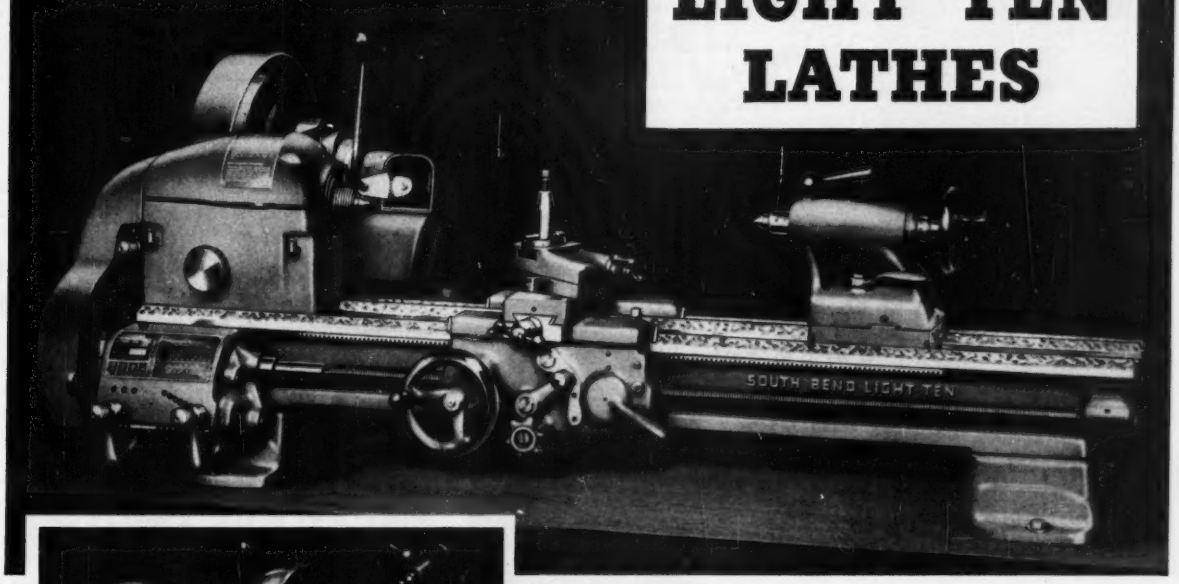
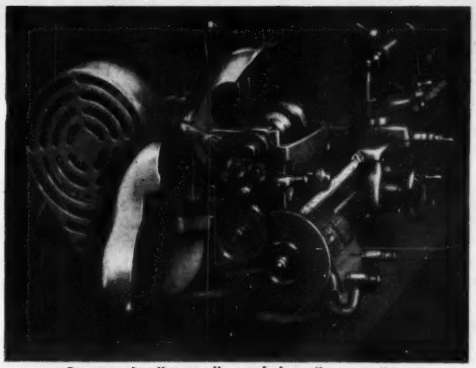
South Bend LIGHT TEN LATHES





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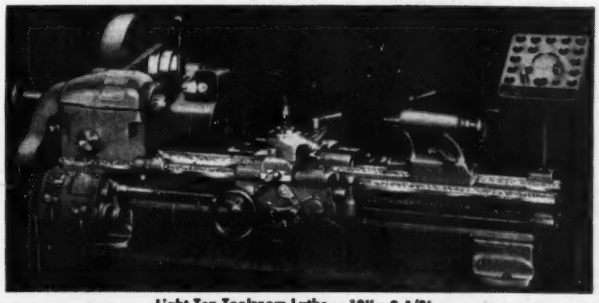

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By Aaron Adams, University of Cincinnati, Cincinnati, Ohio

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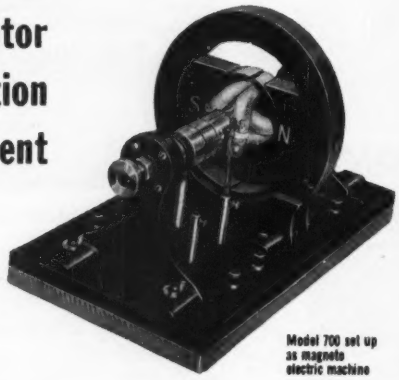

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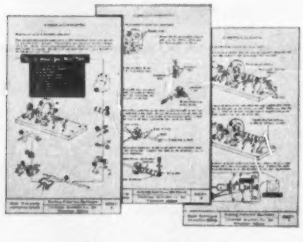

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Diamond Dust

Abrasive comments from that doughty Scot, Tom Diamond, former head, Department of Vocational Education, University of Michigan, Ann Arbor.

Trouble, Trouble, Boil and Bubble

"THE troubles that afflict the just great and many are." How true are these words of wisdom. In contrast to this, we find that the sun shines with complete impartiality on the just and the unjust.

To those of us who claim to be just, and all industrial-arts teachers do—we hope—this seems like rank discrimination. Just think of it fellows, that no-account So-and-So who disregards the Ten Commandments basks in the same sunshine as we—the righteous members of society — enjoy. Concurrently with this basking process we are told that we must bear with fortitude many afflictions from which, apparently, he is spared.

Evidence of this inequity was first recorded in the Old Testament, where some old coot was afflicted with boils. Then some of us are afflicted with a Presbyterian conscience, which permits us to get into sin, but prevents us from enjoying it after we are in.

Again some are afflicted with a Big Head, which gives us an inflated opinion of our own importance in the affairs of men. Others are cursed with the belief that they have the answers to all of the problems of the universe. This latter affliction is frequently accompanied by another which causes these benighted souls to assume that their mission in life is to tell the cock-eyed world all they think they know.

Other examples might be mentioned,

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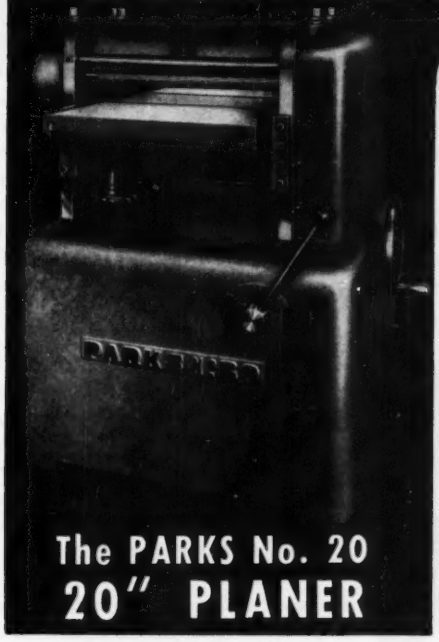

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The Parks No. 20. 20" Planer has a 4-knife cutterhead with a speed of 3600 R. P. M. and offers two feed speeds—20 and 40 F. P. M., and 40 and 80 F. P. M. Will take work up to 20" wide by 6" thick. Ruggedly built for vibrationless operation.

The Parks Heavy-Duty 12" x 4" Planer. A compact, sturdy thickness planer that offers mill planer precision at low price. Has feed speed of 16 F. P. M. at 4000 R. P. M. Will handle material as short as 6" and as thin as 1/16".

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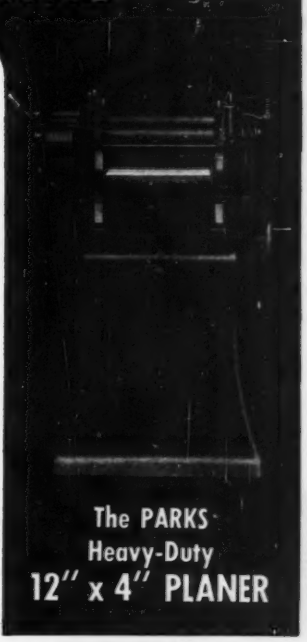

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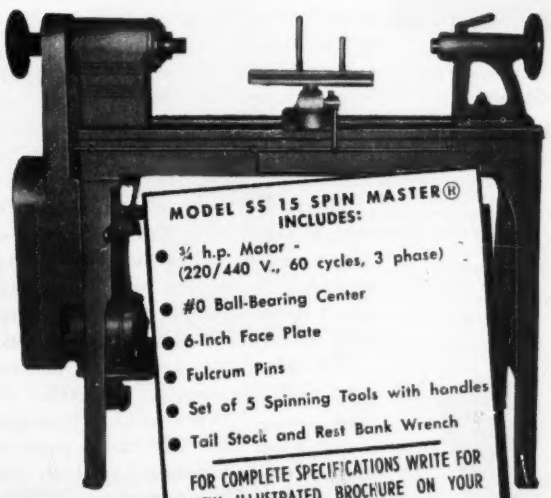

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but these will serve to illustrate what we who are more or less "just" must bear.

However, from the point of view of the industrial-arts teacher, these are abstract, and he reflects more deeply over other afflictions which, to him, are more concrete.

For example, he bemoans the fact that he is afflicted with a supervisor whose sole mission in life appears to be to record the number of nails a teacher uses, or the number of nailsets that are missing at the end of the term. He has neither time nor inclination to help the teacher with his current problems. If by chance he visits the teacher, it is likely that he does so for the purpose of berating him for being tardy in submitting his reports. There is no panacea for this affliction. One might just as well bear it with all the fortitude he can muster.

Then who has not heard of the unfortunate teacher whose principal takes a dim view of industrial-arts. He looks on the subject as a blot on his otherwise cultural program. He permits its existence in his school merely because someone higher in authority has decreed that it shall be there, and looks on it as a cross he must bear. And all the while he is seeking an opportunity to unload it on someone else. The only remedy for this situation that occurs to us is to enlist the aid of the public exterminator, and have the culprit burned at the stake.

Some academic teachers, too, are responsible for the industrial-arts teacher being slightly indisposed. They know nothing about the contribution industrial arts is making to the education of children, and, unfortunately, they make no effort to find out. It is their considered opinion that shop teachers are merely mechanics whose proper place is in industry. And it is their feeling that if the pupils learn anything in the shop, which they seriously doubt, it should be taught some place other than the school. We can feel sorry for these individuals as they are more to be pitied than blamed.

Frequently, parents can be an annoyance to the shop teacher. They are acutely aware that their children are unusually bright. Because of this they are unable to understand why their particular Willie is not permitted to draw the plans of their proposed new house, make an elaborate china-cabinet, or build a 24" TV set. They fail to understand that there are fundamentals in every subject which must be mastered before more advanced work can be attempted. If by chance they do appreciate this fact, they appear to feel that this principle applies only to ordinary children, but certainly not to their bright offspring.

Parents are likely to become an affliction to the shop teacher when they discover that he does not understand their children. When Willie comes home from school he expresses the opinion that the teacher fails to grasp the idea that he, being brilliant—this has been impressed on him at home—should be permitted to express himself in a manner in keeping with his unusual ability. Since the Oracle has spoken, the mothers storm into the classroom for the purpose of pointing out to the poor teacher all of his shortcomings. The teacher, being a tactful soul, is surprised to find the mothers so young, and he voices the thought. This attitude does much to soften the attack, but it in no way alleviates the affliction with which the teacher has to contend.

We opened this analysis by announcing that "the troubles that afflict the just _____". We would like to emphasize this fact once more, and to point out that only a few of them have been mentioned here. There are others—many of them—but sufficient has been said to indicate that the path of the industrial-arts teacher does not always fall in pleasant places. ★

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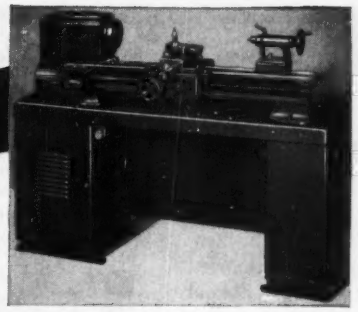

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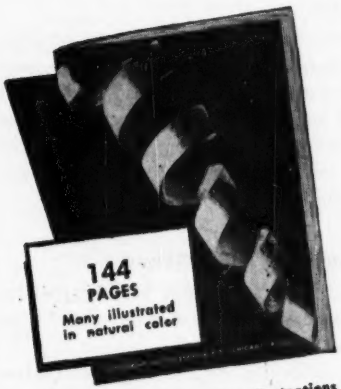

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School Shop KINKS

Payment will be made for each Kink published. Send to Editor, School Shop, Ann Arbor, Mich.

For Sawing Plywood

Here is a sawing kink that works equally well when cross-cutting plywood with either a power saw or a hand saw.

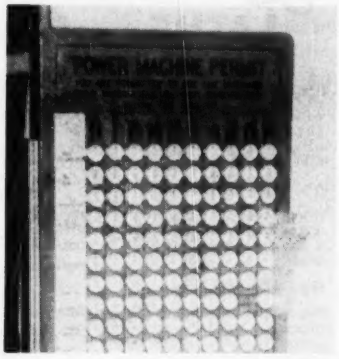
After you have drawn your guide line for the cut, cover the line with transparent tape (at least 1" wide). Be sure the line runs along the center of the tape. The tape will keep the wood from splitting along the edge of the cut.—*Donald J. Hendrick, Grand Marais, Mich., High School.*

Guidance Project

A new guidance project is being tried out this year in Dunkirk, N.Y. All the boys in the sixth grades in the elementary schools in the city are transported to the Dunkirk Industrial High School for three hours of shop work per week for a month. This enables each sixth grader to have a week of shop experience in the four trades taught in the school. Each sixth grade is assigned a different month to come to the vocational school.—From *Viewpoint,* publication of the New York State Vocational and Practical Arts Association.

Tagged for Safety

To cut down on preventable accidents, a power machine permit board is valuable.



Here's how the board is used. Before any student can use a machine he must: (1) have his parents' written permission; (2) observe a lecture and demonstration by the instructor; (3) study printed safety rules for each machine; and (4) pass a test, scoring 100 percent.

Once these steps are completed, a tag is placed after his name on the board and in the column under the particular machine, which gives him permission to use that machine.

A student may be given up to three chances to pass the final test on each machine.

A student's tag may be removed from the board for cause. If he purposely breaks a safety rule, his tag is removed for a period of a week. Three violations forfeits his right to use the machine for the school year.—*Harvey D. Miner, Weston, Ohio, High School.*

Uses of Water Glass

Here are some uses for inexpensive water glass (silicate of soda) that I have found very helpful:

In soldering or welding, water glass can be substituted for borax and the more expensive welding fluxes, especially for silver soldering and welding cast iron. The water glass is merely painted on the surface of the metal where it is to be soldered or welded.

Water glass is also a fine cement. It can be used by itself for cementing glass to glass. To cement glass to porcelain, a solution of 60 parts water glass and 10 parts casein (dried powdered milk) should be used. The cement must be applied as quickly as possible and the

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★SHELDON SAFETY
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SHELDON-taught students are ready to operate standard industrial lathes—are familiar with standard controls and the "big lathe feel".

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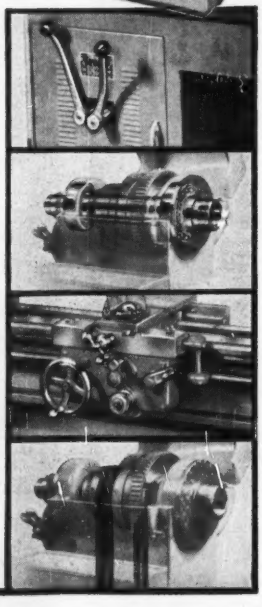

Built by modern methods, with the finest machine-tool special machinery, on a continuous production line basis, these better lathes cost little more than ordinary school type lathes. *Write for Catalog*

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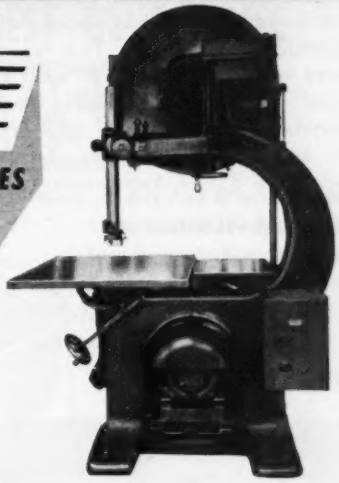

Smooth and absolutely vibrationless in operation, with wheels thoroughly guarded and equipped with synchronized two-wheel brakes which automatically apply and instantly stop the machine in case of saw blade breakage. The finest and safest band saw made. Widely used in industry for cutting both wood and metal — and the best possible bet for shop training. For complete details write for Bulletin "GE". Our line contains band and mitre saws to fit every logical budget, built by sawing machinery specialists.

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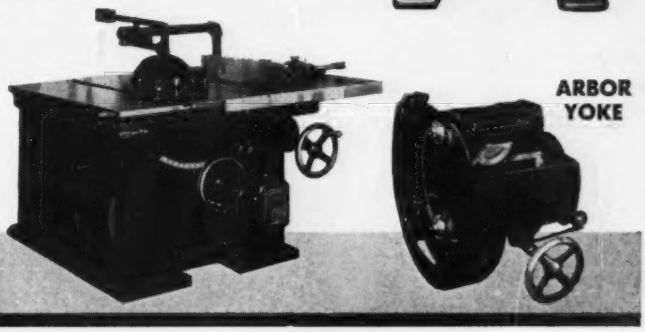
Carries two instantly interchangeable saws or other cutterheads on tilting arbors. Only one motor runs at a time. Automatic electric brake stops saw when current is shut off — no accidents can be caused by coasting saw. Write for Bulletin "JDR". Get the complete facts concerning this favorite of schools that want the best. We will gladly consult with you on your sawing requirements.



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cemented articles dried in an even room temperature.

A good aquarium cement can be prepared by mixing common cement with a mixture of water glass. This cement is very quick hardening and must be applied as quickly as possible. It is waterproof, nonpoisonous, and dries hard as stone.—*Louis Enos, Lincoln Junior High School, Sacramento, Calif.*

Soap Lubrication

When boring deep holes in wood using the tail stock of the wood lathe, the drill has a tendency to heat excessively due to the great friction. I have found that one method to overcome this is to lubricate the inside of the hole with liquid soap of the type found in most school soap dispensers.

The drill should also be retracted periodically and the chips removed.—*William E. Martin, McCulloch School, Marion, Ind.*

To Prevent Tool Abuse

Most of our vocational-school machine shops have classes of different grades occupying them during the day. One class may be an elementary one, and another, advanced. The beginners often abuse delicate or special tools, which means that the upperclassmen then are handicapped by the tool's poor condition.

I have found the following kink helpful. In a wooden cigar box I keep any special or delicate tools needed for the class jobs. These are changed as the class progresses from one job to another. I put this container in the toolroom when the class enters the shop and remove it when they leave, using a different box for each class of different grade.—*Leonard A. Kroll, Samuel Gompers Vocational and Technical High School, Bronx, N.Y.*

A Glue Board

Every industrial-arts activity uses glue in some form or other. The dispensing of glue normally is just one more problem for the shop teacher to face because of its messiness and waste.

One means of facilitating the use of glue is a glue board (shown below). This board is treated the same as any tool board in the shop. Mounted on it are various adhesives available for student use.

Most glue, such as cold glue, rubber cement, and duPont cement, can be dispensed right from the containers in which they come.

Weldwood and other glues which have to be mixed present another problem. To prevent waste and a conglomeration of containers scattered about the shop holding glue in various stages of hardness, the use of a soap dispenser for the glue and a tube of paper cups as mixing containers is recommended. It has been found that a student will not keep punching the handle of the dispenser but will stop when he has measured out the amount of glue for his needs. And the paper cup used for mixing can be thrown away after use.—*Taylor A. Harter, Teachers College, Oswego, N.Y.*

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Stay sharp 10 times longer — even cut through screws and wire nails

Still going strong after boring through 15 ft. of hard maple, 188 screws, and 376 wire nails! That's the remarkable record of a *single* "Dyno-Mite" Bit used to prepare demonstration blocks like the one shown above.

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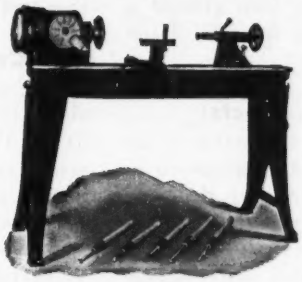
12" Extension available

Instructors find the "Oliver" Metal Spinning Lathe most useful machine in the shop!



Students soon learn to spin articles of beauty and usefulness from copper, bronze, aluminum, etc. The "Oliver" Lathe has a heavy bed, extra large bearings and live tail center. Has ball bearing motor driven headstock adjustable from 800 to 2750 r.p.m. Swings 12" diameter, 24" between centers. For turning wood, this Lathe is unmatched. *Write for Bulletin No. 159-M.*

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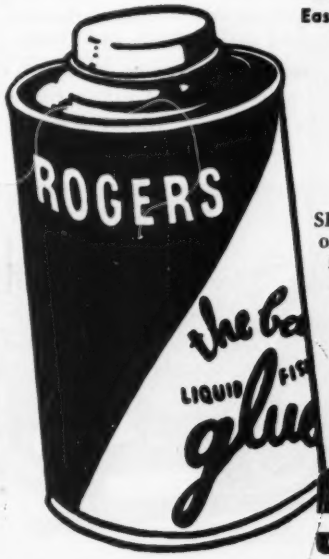

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Best natural wood finishing system yet for school use! Obtain beautiful natural, bleached modern or tinted finishes — glossy or dull — quickly and professionally, without a finishing room! The new Spee-D-Dry system requires just two sealers, two alkyd finishes. That's all. Mix any oil paint, color or stain with them. Your durable, inexpensive finish dries dust free in minutes. Already in use by hundreds of enthusiastic shop instructors. Write for free color chart and "How To" booklet today.

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4 Quarts Spee-D-Dry sealers and finishes, 12 tubes tinting colors, 12 half-pts. oil stain, full instructions, only $11.95, f. o. b. Detroit. Satisfaction guaranteed. Limit two per school.

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Designed with the school shop in mind. For instance, a Detroit owner says, "Still in perfect condition after more than eleven years of hard service."

Safer than a band saw . . . throat capacity equal to a $600 band saw . . . saws 5-inch thick stock like a band saw . . . does contour and straight cutting, inserted blade work, die filing, saber sawing and sanding . . . cuts wood, metal, fibre, plastics . . . 20" x 20" work table, tilts 45° two ways . . . chucks and correctly tensions every blade from 1/16" to 1/2" . . . 5" to 9" long . . . guaranteed plumb cuts to face of work . . . blades rotatable 90° for ripping long stock . . . overall size: 39" high, 20" wide, 38" deep.

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News

HAPPENINGS IN INDUSTRIAL EDUCATION

IA Teacher Honored

MAURICE OVERHOLT, industrial-arts instructor in the Grand Haven, Mich., High School, has been selected for a Ford Foundation Fellowship to study silversmithing, jewelry, and ceramics in Mexico during the coming school year.

Mr. Overholt, who was one of 300 teachers in the nation chosen for fellowships, based his application on the creative aspects of industrial arts as expressed through jewelry, silverwork, and ceramics.

Mr. Overholt plans to study at Mexico City College and at Tasco, 40 miles from Mexico City. He has been granted a year's leave of absence from the Grand Haven school system.

Oregon IA Assn. Elects

AT the recent annual convention of the Oregon Industrial Arts Association in Portland, Charles Ward of Redmond Senior High School was elected president for the coming year.

Other officers elected were Robert Veley of Woodmere School, Portland, vice-president; and Roy J. Lively, Bend Senior High School, secretary-treasurer.

A resolution was adopted at the convention advocating a state supervisor or consultant for industrial arts.

Dual Celebration

A DUAL observance of the 25th anniversary of the founding of the Epsilon Pi Tau Fraternity and the 60th anniversary of the introduction of manual training in Ohio State University was held at Columbus on March 13 by Alpha Chapter of Epsilon Pi Tau.

A forum on "Problems That Lie Ahead" was held at the afternoon program. Forum members were John R. Ludington of the U.S. Office of Education; J. Homer Winkler, past president of the International Association of Printing House Craftsmen; James S. Kirkpatrick, president of the Magnesium Association of America; and Gerald Baysinger, president of the American Council on Industrial Arts Teacher Education.

In the evening Henry R. Herrman of Wayne University spoke on "A Humanistic Education for Industrial Man."

Colorado Officers Chosen

WALTER SWALLOW of Pueblo, Colo., Central High School was elected president of the Colorado Industrial Arts Association at its recent annual meeting in Greeley. He succeeds Alan M. Lytle of West Denver High School.

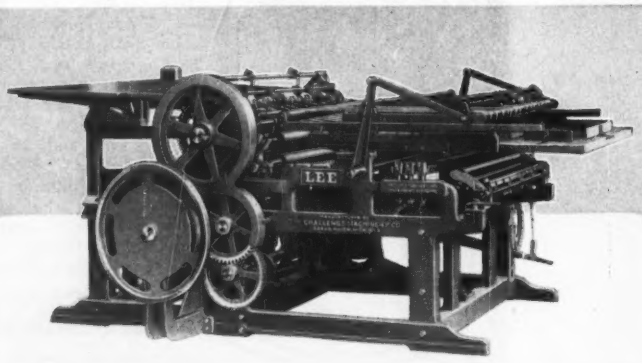
Clarence T. Babb of Colorado State College of Education was reelected vice-president, and Harold Underhill of West Denver High School was reelected secretary-treasurer.

New Course in Wisconsin

THE Green Bay, Wis., Vocational and Adult School is offering what it believes to be the first vocational school course to be made available in the trade of rubber engraving.

Convention Calendar

Georgia Vocational Association, Biltmore Hotel, Atlanta, June 10-11.
Pennsylvania Vocational Conference, Eagles Mere, Pa., June 15-18.
Colorado Vocational Association, Colorado A & M College, Fort Collins, June 21-25.
Conference on Cooperative Education, Ohio State University, Columbus, Ohio, June 28-29.
International Graphic Arts Education Association Conference, University of Colorado, Boulder, July 4-8.
Four-State Regional Industrial Arts and Vocational Education Conference, Kansas State Teachers College, Pittsburg, Kan., Oct. 1-2.



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No. 38, 26 x 38 inch bed size, carrier delivery, 2,500 per hour . . . Strong, rigid impression; two form rollers with rider roller, rack-and-screw and table distribution, impression trip, brake, counter, jogger.

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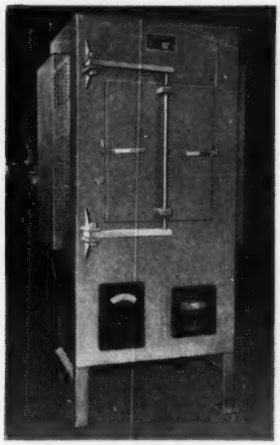

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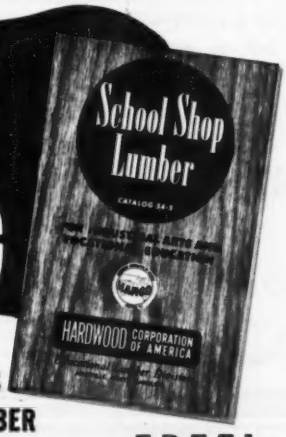

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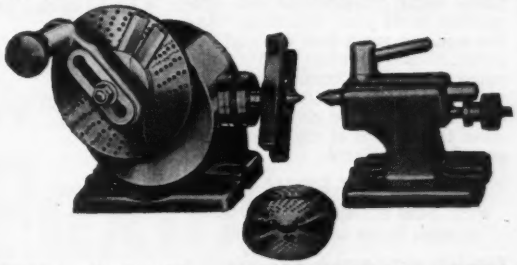

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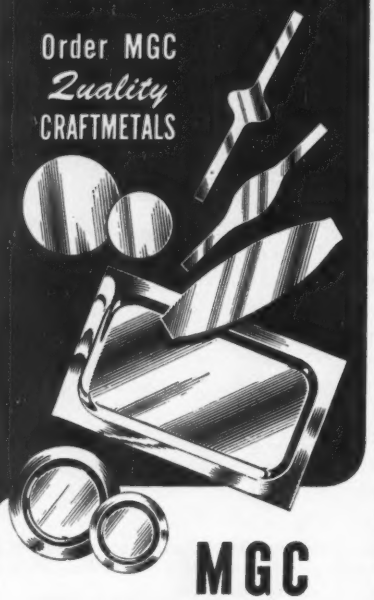

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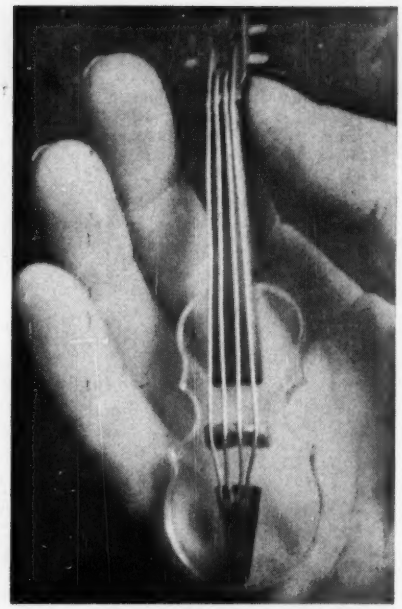
Plastic Lapel Pin

By Alfred Wilson
Lapeer, Michigan, High School



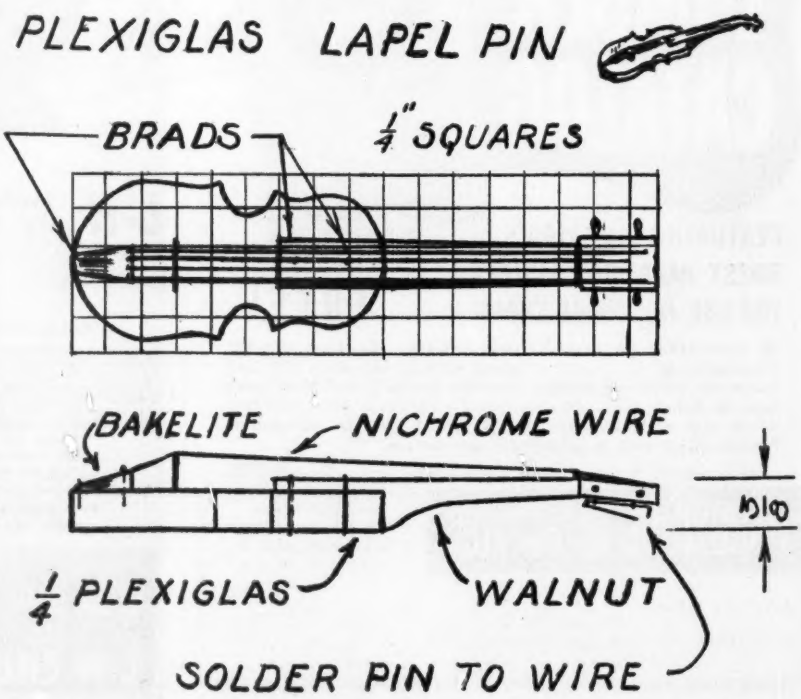
This lapel pin is made from plastic and walnut and is an inexpensive gift for musicians.

MUSIC-LOVERS will like this plastic lapel pin. A number of basic operations in working plastics are involved from the instructional standpoint and it also gives the student an opportunity to combine metal and wood with plastics.

The pin is made from ¼" acrylic sheet plastic while the fingerboard is made from walnut. After the body of the violin is completed (which involves sawing, filing, drilling, and polishing), the fingerboard can be made and the holes drilled for the brads slightly smaller than the brads themselves. The holes in the plastic should also be slightly smaller than the brads. The brads can be inserted with a mandrel press or with pliers protected with felt to prevent marring the plastic. Be sure to leave the two brads next to the bridge projecting enough to hold the wire strings.

Notches should be cut in the bridge and saddle to hold the strings firmly. Small wooden pegs can be made and inserted as shown in the drawing. The wooden parts should be shellacked.

The finished pin is an inexpensive gift which requires careful craftsmanship to make and is appreciated especially by fiddle players. ★



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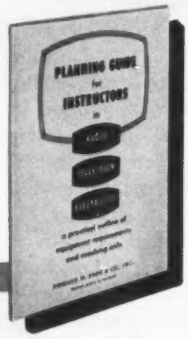

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Instructional RESOURCES

Books:

Patternmaking and Founding. Smith. Bloomington, Ill.: McKnight & McKnight Publishing Co., 1954. Pp. 111. $1.00.

This is a beginner's text in which the basic fundamentals of making and using patterns are presented.

The book is divided into 35 separate units, each one dealing with a single phase of the subject. Among these units will be found some that call for the use of manipulative processes. Others, which are just as valuable, include units on various types of metals, and the processes through which they must pass in their movement from raw material to the finished product.

Robert E. Smith is Professor Emeritus of Education, the Ohio State University.

Drawing, Sketching, & Blueprint Reading. Coover. New York: McGraw-Hill Book Co., 1954. Pp. 377. $3.96.

The materials in this book were selected from many common drawing areas, and the problems suggested represent live projects rather than meaningless exercises.

The text is designed to meet the needs of secondary-school pupils, with special emphasis being placed on blueprint reading. Since a wealth of related material has been included, the text should serve equally well for a specific course in drafting, or for courses in which drafting is taught in relation to shop work.

Text material is profusely illustrated by excellent drawings and pictures which serve to clarify the topics, as well as to make them more interesting.

Shriver L Coover is Director of Industrial-Arts Teacher Education, State Teachers College, California, Pa.

Third Yearbook—American Council on Industrial Arts Education. Bloomington, Ill.: McKnight & McKnight Pub. Co., 1954. Pp. 200. $4.00.

This Yearbook deals with three studies made by three individuals from different parts of the country. These studies are as follows:

"Some Components of Current Leadership," Dr. Ray F. Bergengren, Jr., University of Florida, Gainesville, Fla.

"Techniques of Selection and Guidance of Graduate Students," Dr. George F. Henry, Colorado A&M College, Fort Collins, Colorado.

"An Analysis of Textbook Emphasis," Dr. Talmage B. Young, Berry College, Rome, Ga.

The editor of the book considers that the problems discussed are controversial, but it is his feeling that it is proper that live issues such as these need to be brought into the open in order that they may be resolved. He points out that a free discussion of these issues cannot help but result in progress.

Course Construction in Industrial Arts and Vocational Education. Giachino and Gallington. Chicago: American Technical Society, 1954. Pp. iv+146. $3.50.

The process of developing a course of study is covered quite thoroughly in this book. The problem of determining the philosophy on which the course is to be based is first considered. From this it goes on to a consideration of the analysis of the subject to discover the operations and the related knowledge to be taught. Methods of arranging this material into a logical teaching order are suggested, and the preparation of appropriate job sheets to be used as an aid in teaching is covered.

The arrangement of the topics, along with the lists of thought-provoking questions, suggest that the book will have its greatest value as a text for teacher-training classes.

J. W. Giachino is Professor of Industrial Education at Western Michigan College, Kalamazoo, Michigan. Ralph O. Gallington is Professor of Industrial Arts at Pennsylvania State University, State College, Pa.

Pamphlets:

Whittling Is Easy with X-acto in a new, expanded edition which had been issued by X-acto, Inc. The 40-page booklet contains 34 new projects designed by Leroy Pynn, Jr., noted wood-carving authority. A nine-page section is devoted to Indian woodcraft designs. Copies are available for 25 cents from X-acto, Inc., 48 Van Dam St., Long Island City 1, N.Y.

Audio-Visuals:

New Horizons in Aluminum Brazing is the title of a 16mm color movie produced by the Aluminum Company of America. The 22-minute film not only shows what can be done in joining parts by brazing but also shows how to do it. Requests for prints should be made on school letterhead to Alcoa Motion Picture Department, 854 Alcoa Building, Pittsburgh 19, Pa.

The Bounty of the Forest is a 28-minute full-color documentary film with sound which relates the story of wood from its growth through its harvest, manufacture, and utilization as a building material. The film also pictures and describes the Western Pine Association research laboratory as well as identifying many of the trees of the West and the uses to which they are put. Requests should be addressed to the Western Pine Association, Yeon Building, Portland 4, Ore.

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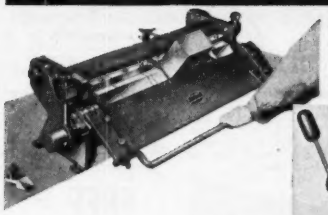

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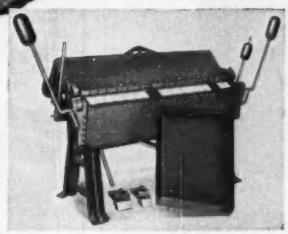

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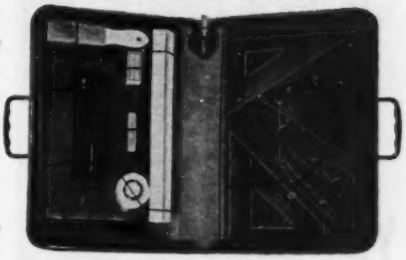

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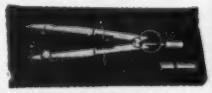

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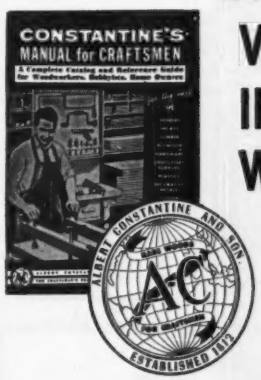

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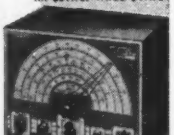

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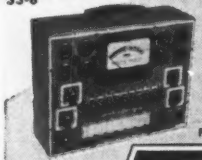

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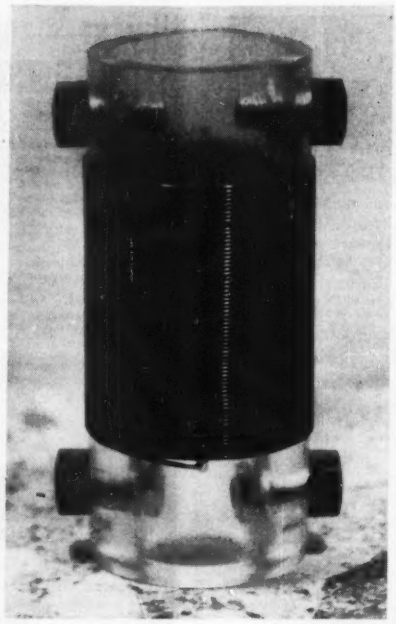
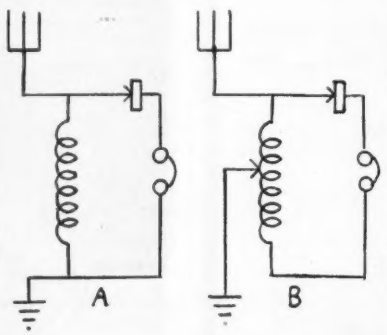


Simple Crystal Radio

By Horace Gambell

Los Alamos, New Mexico, High School

STUDENT interest is aroused immediately by this simple crystal radio which will bring in local stations with ample volume. A coil of wire, germanium crystal, phones, antenna, and ground are all that are needed to bring in a good signal from nearby transmitters. The wiring diagrams follow:



The coil is easily made by winding approximately 60 turns of #22 magnet wire on any nonmagnetic tube such as plastic (shown above), cardboard, wood, etc., approximately 1½" d by 3". Use banana or pin jacks and plugs for antenna, ground, and phone connections. Connect the crystal inside the tube. To make the set more selective, tap the coil every ten turns as shown in *B*.

You now have a radio that really works and stimulates that gleam in the youngsters' eyes. ★

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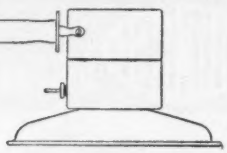

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Designed for the firing of enamels that have been applied to one side of a metal piece, pieces up to 4⅜" in diameter and 1½" high may be fired in this kiln.

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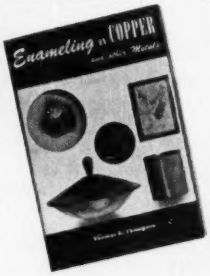

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by Thomas E. Thompson. This illustrated 40-page book answers your questions about fascinating metal enameling . . techniques, tool and equipment, types of enameling, firing, finishing, etc.

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Lock . . . . . *from page* 11

The first two operations should be skim cuts and performed primarily to remove scale and produce a clean surface. Step 2 is a bench operation and consists of laying out, drilling, sawing, and cutting to remove some stock before filing.

It has been found that the simplest method of performing Step 3 is first to cut the six discs from a plate of scrap aircraft duraluminum by using a 1¼" hole saw. Then it is quite simple to mount the discs on an arbor and turn between centers. The two 1/16" steel end plates may also be turned in the same manner. In Step 4 the discs are placed in a universal chuck for the relief cuts before the locking-pin slots are filed.

Steps 5 and 6 deal with turning the staple shaft, inserting the pins, and bending the staple hook. It is suggested that the pin holes may be laid out by merely scribing along the side on which it is to be located.

Before the lock is ready to be assembled it is necessary to weld the hexagonal nut on the barrel in such a position that will give the staple support.

The numbers may be stamped on the discs in any order desired, and it may be noticed that any arrangement of numbers may be selected. Some boys prefer to use their house number or telephone number. The final step is to assemble the lock and seal the two end plates in position with solder.

Locks are like puzzles and possess a great deal of fascination and intrigue. If a boy is given the opportunity actually to construct a lock which he can use for many years, his interest soars—especially when the lock is one that is very difficult to "pick" since there are several million possible combinations, and, also, when it is much more sturdy in construction than most locks of equal size. Try it in your shop and see. ★

Strictly Personal

ABOUT YOUR FELLOW TEACHERS

EUGENE D. FINK, chief, bureau of vocational curriculum development and industrial teacher training, New York State Department of Education, retired March 1 after 43 years of service in the department.

AARON ADAMS is now on the vocational-education staff of the University of Cincinnati, Ohio. A former drafting instructor in Marion, Ind., public schools, Mr. Adams recently served as a supervisor in the General Electric Company's jet engine plant in Cincinnati.

WILLIAM C. BICKNELL, head, industrial-education department, Southern Illinois University, Carbondale, died February 15.

LEWIS H. EWING, former head, building and trades department, Arsenal High School, Indianapolis, Ind., and a member of the industrial arts staff for 18 years, died recently.

HAROLD M. OSTREM, Minnesota assistant state director of vocational education, is the new director of vocational and adult education for the St. Paul, Minn., public schools.

ALBERT E. JOCHEN, director of the Middlesex, N.J., Vocational and Technical High Schools, succeeds JOHN A. MCCARTHY as New Jersey's assistant commissioner of education in charge of the vocational division.

FRANK HUFFAKER, director of vocational education, Chattanooga, Tenn., died March 3. ★

Over 85% of the torque wrenches used in industry are
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TORQUE WRENCHES
Read by Sight, Sound or Feel.
Permanently Accurate
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Faster—Easier to use
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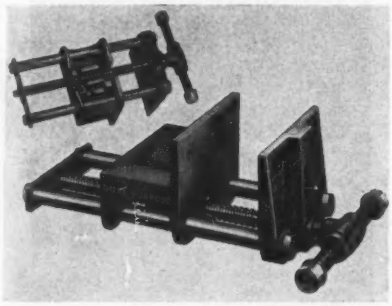
News from INDUSTRY

(Circle the numbers on the card in this issue to secure the items listed below.)

Dual Purpose Woodworking Vise



The Morgan Vise Company has announced development of a new dual-purpose woodworking vise, Model 18-A, which incorporates advantages of the quick-action vise with the smooth operation of the continuous-screw type.

The manufacturer claims that this is a great improvement in woodworking vises and should be of particular interest to school shop instructors.

The vise screw which has a continuous buttress thread (shown in the top illustration) is manufactured from extra-heavy cold rolled stock. All castings are semisteel and machined to very close tolerances.

Additional information may be obtained by writing the manufacturer, Morgan Vise Company, 108 N. Jefferson St., Chicago, Ill., mentioning SCHOOL SHOP; *or circle no. J1 on the business-reply card.*

Perspective Sketching Device Developed

Sketch-Easy is a template which the manufacturer states will enable those without drawing experience to execute sketches in perspective.

The sketching template, 8½" x 11", is constructed of clear .020 Vinylite plastic sheet. It is processed with five black lines within a rectangle, the five lines acting as a guide in making a technical sketch. When in use, the template is placed beneath a sheet of paper so that the guide lines show through.

A 24-page example book of instructions, boxed and punched for three-ring binders, is packaged with Sketch-Easy.

For more information, write California Visual Aids Co., 6214 Manchester, Los Angeles 45, Calif., mentioning SCHOOL SHOP; *or circle no. J2 on the business-reply card.*

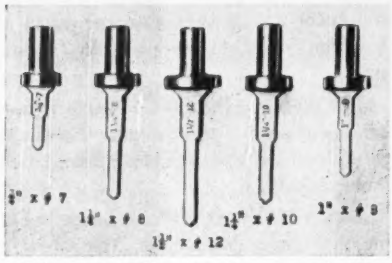
Boice-Crane Replacement File Bands

Incorporating a new file segment joint design, a file band is being made available as a replacement item, according to Boice-Crane Company, the manufacturers.

By a combination of miters, bevels, and half-lap end construction, the file segments align themselves and join in such a way as to present the equal of a solid file to the work, and give an angular, rather than a straight joint between segments. The result is a smooth skew cut without bump or chatter when laps pass the work zone, the company states. A patented end lock connects and disconnects easier and quicker for inside filing, file installation or removal.

For more information, write Boice-Crane Company, 938 Central Ave., Toledo 6, Ohio, mentioning SCHOOL SHOP; *or circle no J3 on the business-reply card.*

New Tool Combines Three Drills



Edward L. Sibley Manufacturing Co., Inc., has recently introduced a new tool that is a combination of three drills.

Called the Screw-Dril, the company reports that the item prepares wood for a screw by drilling, in one operation, the proper size hole for the screw thread, body, and head.

Five sizes of Screw-Drils are available in a kit and 28 other sizes are available. The new tool is being distributed through hardware stores and boat suppliers or write direct to the factory, the Edw. L. Sibley Mfg. Co., Inc., Bennington, Vt., mentioning SCHOOL SHOP; *or circle no. J4 on the business-reply card.*

Peerless Introduces a Metal-Sawing Machine

Speedy-Cut, a 6" x 6" capacity metal-sawing machine and manufactured by the Peerless Machine Company, has been recently added to the company's line.

It is a two-speed machine for general-purpose use, they state. A broad-shouldered "U"-type over-arm is accurately machined. The saw blade is held by special flat steel blade holders. Adjustable gibs on the top and side of the saw frame guide compensate for wear, the manufacturer says.

To find out more about this economically-priced machine, write Mr. Frank Wruk, Peerless Machine Co., 1600 Junction Ave., Racine, Wis., mentioning SCHOOL SHOP; *or circle no. J5 on the business-reply card.*

New Formica Kit

Now available to industrial-education teachers is a new Formica Vocational Kit offered by the Formica Company.

The kit contains 50 sheets of Formica, 24" x 24", and 50 each of three pieces of instructional literature showing step-by-step procedures in installing Formica tops on sinks, vanitory units, tables, etc.

The kit is offered to industrial-education teachers at a special price of $5. Write G. W. Sieber, The Formica Co., 4614 Spring Grove Ave., Cincinnati 32, Ohio, mentioning SCHOOL SHOP; *or circle no. J6 on the business-reply card.*

New Designs on Open End-Box Wrenches

Through a redistribution of weight, J. H. Williams & Co. states that its new line of open end-box "Superrenches" embodies a new conception in wrench proportions, resulting in slimmer heads, longer and narrower handles.

The new designs permit nut rotation in more difficult and confined quarters. Sizes range from ¼" to 1⅝".

Write J. H. Williams & Co., 400 Vulcan St., Buffalo 7, N.Y., mentioning SCHOOL SHOP, for more information on these and other wrenches; *or circle no. J7 on the business-reply card.*

L-W Chuck Company Announces Demagnetizer

A new, round, coil-type demagnetizer which removes magnetism from tools, such as drills and reamers, small parts, or work which has become magnetized, has been developed by L-W Chuck Company.

An unobstructed opening is 3¾" in diameter to accommodate parts up to that dimension. It is said by the manufacturers that the quick passing into the opening is sufficient to demagnetize the object affected, and no contact with the part is required. Control is by pushbutton.

There are no moving parts and the demagnetizer is designed to operate on 110-v, 60-c, a-c current. It may also be used to magnetize, as well as demagnetize.

For free literature, write L-W Chuck Company, 69 South St. Clair St., Toledo 4, Ohio, mentioning SCHOOL SHOP; *or circle no. J8 on the business-reply card.*

New Hot Plate Designed by Temco

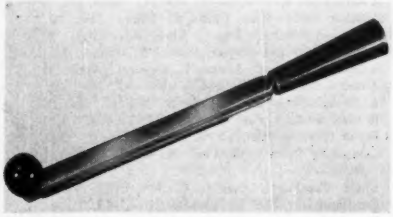
Type 2600, a hot plate manufactured by the Thermo Electric Mfg. Co., is made of corrosion resistant stainless steel separated by a Marinite insulating plate which minimizes heat transfer into the bottom section.

The manufacturer states that it will support heavy loads and its smooth cast-iron top plate is serviceable for applications where an aluminum top plate is not suitable.

Surface plate temperature is regulated by a four-heat switch to which the heating element is directly connected. Four surface temperatures are provided. The hot plate measures 9" square, 6" high and weighs 15 lbs.

Write the Thermo Electric Mfg. Company, 490 Huff St., Dubuque, Ia., for further information, mentioning SCHOOL SHOP; *or circle no. J9 on the business-reply card.*

Light-Weight Hand File Introduced



Severance Tool Industries, Inc., has introduced a new, light-weight, streamlined carbide hand file.

The usual 50 to 1 economy of carbide over steel is gained in this type of file, the manufacturers state, and it can be resharpened many times.

Complete information can be obtained from Severance Tool Industries, Inc., 694 Iowa St., Saginaw, Mich., mentioning SCHOOL SHOP; *or by circling no. J10 on the business-reply card.*

Unique Imported Saw Blade

A "coping" saw blade that fits into a hacksaw frame is a new imported item that is being distributed by Dafile Distributing Company.

The new item is said to cut metal and plastics as a jig saw cuts wood—scalloping, doing intricate "carving" work on hard metals in all directions without removing the blade. Sets are available in coarse, medium, and fine teeth with adapters to fit any hacksaw frame.

Write Dafile Distributing Company, Dept. M 6, 1062 College Ave., New York 56, N.Y., mentioning SCHOOL SHOP; *or circle no. J11 on the business-reply card.*

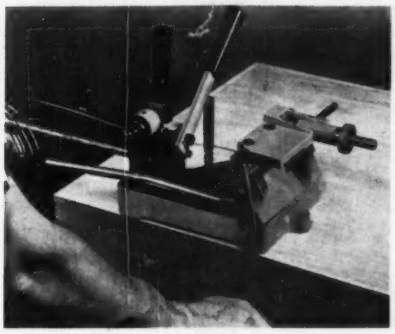
Handy Soldering Gun Available

Weller Electric Corporation is featuring a new soldering gun that is said to offer many advantages.

The gun gives instant heat, has dual spotlights, a trigger switch, and replaceable tips. Its streamlined design permits reaching tight, difficult spots, the company reports.

For more information about this tool, write the Weller Electric Corp., Easton, Pa., mentioning SCHOOL SHOP; *or circle no. J12 on the business-reply card.*

New Spring Winding Machine



The O'Neil-Irwin Manufacturing Company has announced the addition of a new spring winding machine that can be operated without any experience or special skill. The Di-Acro Spring Winder is a complete selfcontained unit with a special cut-off lever incorporated right in the machine.

The company says the machine is ready for operation as soon as it is mounted on a bench or in a vise. Any gage wire, to ⅛" diameter, can be wound into extension, compression, torsion, and flat springs. Round, flat, square, or rectangular shaped stock can be formed into springs of any length.

For more information, write O'Neil-Irwin Mfg. Co., 611 Eighth Ave., Lake City, Minnesota, mentioning SCHOOL SHOP; *or circle no. J13 on the business-reply card.*

New Literature:

Historical Note on Drawing Instruments is the title of a booklet made available by the V. and E. Manufacturing Company and which gives interesting sidelights on the story of instruments from Egyptian times through World War II. Its 14 pages include reproductions of early instruments and drawings by Leonardo da Vinci. A description of George Washington's drawing instruments also comprises an interesting section of the booklet.

These booklets may be obtained free by writing V. and E. Manufacturing Co., 758 South Fair Oaks Ave., Pasadena 20, Calif., mentioning SCHOOL SHOP; *or circle no. J14 on the business-reply card.*

Planning Guide for Instructors in Radio, Television, and Electricity is the title of a booklet available from Howard W. Sams & Co., Inc. This booklet is a practical outline of equipment requirements and teaching aids based on numerous interviews with shop teachers. One section of the booklet includes sketches of a number of workbenches found practical for shop use. For a free copy, write to Howard W. Sams and Co., Inc., Indianapolis 5, Indiana, mentioning SCHOOL SHOP; *or circle no. J15 on the business-reply card.*

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A Four Corner Clamp . . .
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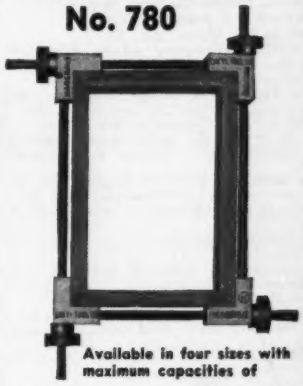
No. 780



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Extensions available to increase above capacities.

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in 8 sizes for wood working. Jaws may be adjusted for various angles.

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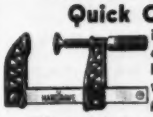
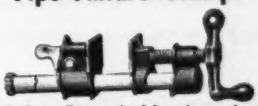


in 61 sizes in 12 different types. Fast . . . easy to use for all applications.

Pipe Fixture Clamps



in 2 sizes. Economical bar type clamp. Fits ½" — ¾" pipe.

No. 640 "I" Bar Clamp

in 7 sizes with patented quick locking moveable jaw. Three other type bar clamps also available.

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A Sticky Subject. Joseph L. Regner. April, 56.
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Easy Lumber Measurement. George Heiden. April, 57.
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For Sawing Plywood. Donald J. Hendrick. June, 22.
For Slipping Clamps. Allen B. Rorvik. Nov., 25.
For Trimming Models. William O. Bruehl. Jan., 16.
From Rugs to Plastics. W. P. McNeer. Oct., 46.
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Help in Marking. James B. Ledstone. April, 56.
How to Pull a Tight Key. W. F. Schaphorst. Jan., 16.
Improving Scroll-Saw Blade. Roger M. Woodbury. Nov., 24.
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Jig-Saw Pusher Stick. Felix W. Howe. Nov. 24.
Lining for Forge Hearth. Elbert B. Wagner. Oct., 46.
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My Teacher Wants A Nail. Armand G. Rehn. Oct., 45.
No More Drawing Boards. M. J. Ruley. Sept., 30.
No More Loss of Rules. Walter E. Bandlow. Feb., 28.
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Rust Preventive. Harry J. Miller. Nov., 25.
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Soldering Bench. E. C. Clouse. Sept., 28.
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Stake Panel and Bench. E. C. Clouse. Nov., 25.
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How to Pull a Tight Key Kink. W. F. Schaphorst. Jan., 16.
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Lining for Forge Hearth Kink. Elbert B. Wagner. Oct., 46.
Locking the Spot Welder Kink. Neil Helgeland. Feb., 28.
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No More Toe Smashing Kink. Robert Nicholas. Nov., 25.
Patent Medicine for Rust Kink. Paul C. Hoopes. Dec., 18.
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Reflector Oven Kit. Neil Helgeland. May, 10.
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A Stool for Shorty Kink. Don Kinnaman. Mar., 20.
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Guidance Project Kink. Viewpoint. June, 22.
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Marking Drills Kink. W. H. Gieseler. April, 56.
Micrometer Cleaning Kink. Roger M. Woodbury. Mar., 19.
My Teacher Wants a Nail Kink. Armand G. Rehn. Oct., 45.
No More Loss of Rules Kink. Walter E. Bandlow. Feb., 28.
Objective Testing of Shop Projects. Charles A. Moore, Jr. June, 13.
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Special Shop Passes Kink. Garth E. Wilcox. Sept., 28.
Tagged for Safety Kink. Harvey D. Miner. June, 22.
To Prevent Tool Abuse Kink. Leonard A. Kroll. June, 24.
Turpentine Saver Kink. David E. Wilson. Oct., 45.
"Wiggle" for Safety Kink. Elvin M. Hunter. May, 18.
Work a Good Horse to Death. R. Paul Lightle. June, 12.
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Must T & I Teachers Be Tradesmen? A. A. Verzani. Nov., 9.
Students See the Community at Work. Donald L. Lippold. May, 12.
Summer Vacation Plus—under the Dunwoody Plan. Milton E. Larson. June, 7.
T & I Teachers Must Be Tradesmen. Gerald B. Leighbody. Jan., 7.
Trade Tests vs. Trade Time. Thomas Diamond. Feb., 16.

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Welded Boat Anchor. Alden D. Groff. Feb., 11.
Wenzel, Arthur C. Wood Finishing Station. Sept., 56.
Wilber, Gordon O. Some Basic Concepts Concerning Industrial Arts. Dec., 7.
Wilson, Alfred. Plastic Lapel Pin. June, 28.
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Bottle Bases for Liquids. J. James Hasenau. Jan., 22.
Brush Cleaning Set-Up Kink. Robert S. Tupper. Feb., 28.
Candle Holder. Charles H. Sechrest. Dec., 28.
Cementing Discs to Sander Kink. Wilson I. Gautier. Oct., 46.
Colonial Bookcase. Harold O. Akeson. May, 9.
Colonial Table. Fred E. Ullrich. Feb., 17.
Easy Lumber Measurement Kink. George Heiden. April, 57.
Elephant Night Light. Rene J. Thomas. Dec., 12.
Fitting for Steady-Rest Kink. William W. Klenke. Dec., 18.
Fluorescent Light Blueprinter. Robert B. Means. Dec., 14.
Fold-Up House Wiring Panel. Hugh Fairbairn. Feb., 30.
For Sawing Plywood Kink. Donald J. Hendrick. June, 22.
For Slipping Clamps Kink. Allen B. Rorvik. Nov., 25.
Help in Marking Kink. James B. Ledstone. April, 56.
Improving Scroll-Saw Blade Kink. Roger M. Woodbury. Nov., 24.
Inlaid Fruit Bowl. James E. Seitz. Feb., 15.
Interpreting Furniture Ads. William F. Haefner. Nov., 15.
Jig-Saw Pusher Stick Kink. Felix W. Howe. Nov., 24.
Knockdown Work Bench. John F. Bartlett. Oct., 50.
Lazy Susan. Ray H. Marxmiller. Oct., 44.
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Modern Coffee Table. Bernard B. Barissa. Mar., 12.
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No More Toe Smashing Kink. Robert Nicholas. Nov., 25.
Place Card Holder Kink. Felix W. Howe. Sept., 26.
Sawing Tips Kink. C. E. Conley. Jan., 16.
Setscrew for Thumbscrew Kink. Roger M. Woodbury. Sept., 26.
Smelling Contest Kink. F. B. Ramsey. Oct., 46.
Soap Lubrication Kink. William E. Martin. June, 24.
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Wood Finishing Station. Arthur C. Wenzel. Sept., 56.

Washington . . . *from page 40*

This spirit of largesse in favor of the "poorer" states may get the bill in trouble for practical reasons. Will Republican lawmakers approve a bill which lowers the amounts of money their states are to receive?

How It Works.—The American Vocational Association has taken the stand that friends of vocational education should not approve, disapprove, nor suggest changes to S. 3271 until its provisions are carefully scrutinized.

As you study the full text of the bill your Senator will send you, keep these facts in mind:

1. S. 3271 repeals all existing vocational-education acts.

2. It authorizes an appropriation not to exceed $36,000,000 a year. (Note that this is an authorization only, with no guarantee the sum would be voted.)

3. No funds are earmarked for vocational education by type or category. Each state would decide for itself how much money is to go for home economics, vocational agriculture, trade and industry, and distributive education.

4. Most of the yearly federal allotment would go for support of ongoing vocational activities. A smaller sum would be available for extension and improvement. And a sum not over 5 percent would go for research and demonstration. To illustrate: under the proposed bill California would receive $910,308 for support, $87,000 for extension and improvement, and perhaps not more than $25,000 for research or demonstrations, if the state proposes a worthwhile project.

5. Each state would still be required to prepare a state plan for approval by the Office of Education. If the Office does not approve, the U. S. Commissioner of Education *could* withhold funds. In that case, the state could take its case to the United States Court of Appeals.

6. While the U. S. Commissioner of Education is assigned the duties of carrying out the provisions of the act, the bill says nothing about a vocational-education division. Money for administering the act is assigned to the Department of Health, Education, and Welfare. Presumably, this could mean that much of the work of administering vocational education could be taken out of the Office of Education and trans-

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terred to the Department's noneducational bureaus.

What About Next Year?—Meanwhile, there is a more immediate problem ahead for vocational educators. It is to assure that the appropriations for next year are in accord with the intent of the George-Barden Act. It has been eight years since Congress declared in that act its intention to give the states a sum not exceeding $29,300,000. This figure has never been voted in full.

There may have been good reasons for this in the past, as Senator George pointed out in a statement prepared for the House Appropriations Committee. During the past decade the federal government has been spending large sums for vocational education through the G.I. programs. Then, too, some states did not have the teachers to enable them to expand their vocational activities. But now, Senator George said, these conditions no longer exist. The G.I. courses have dwindled; there is an adequate supply of teachers in most parts of the country. "And the demand for practical courses is as strong as never before." It is time, therefore, to vote the full $29,300,000 for next year, the Senator pleaded.

The AVA agrees. Its president, Mark Nichols, presented before Congress one of the most masterful statements in support of that position. President Nichols began by saying that vocational education has its origin in the Constitutional concern for "the general welfare." He said: "I'm glad I live in a country where today, as in the days of Washington and Jefferson, the federal government is still interested in providing its citizens with opportunities whereby they can make a living for themselves."

We live in times, Mr. Nichols continued, which call for expanded programs of vocational education. These are times of vast worker migrations, which means that all sections of the country should have the benefit of vocational education, not just a favored few. These are times of struggle with Communist Russia, a struggle which calls for "out-knowing, out-producing, and under-selling Communists in the markets of the world.

"Vocational education is one of the geese which lays the golden eggs of American opportunity," Mr. Nichols said. "This goose needs more federal fund-feed to keep our country strong and productive. The full $29,300,000 is needed for this purpose." ★

AIAA Meeting Planned

At the annual NEA convention, scheduled for June 27 through July 2 in New York City, the American Industrial Arts Association will hold three sessions.

The program includes morning, luncheon, and afternoon meetings on Monday, June 28, at a suite on the 16th floor of the Hotel Shelton. Speakers include Joseph R. Strobel, New York State Director of Vocational Education, and vocational education leaders from the University of Puerto Rico.

Luncheon reservations should be made. Mail a check for $3.75 to Robert L. Thompson, Associate Professor of Education, New York University, Washington Square, New York 3, N.Y.

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Prediction.—We begin this last dispatch for the school year with a fact and a prediction.

Fact: On April 8, Senator H. Alexander Smith (R.) of New Jersey, introduced a bill entitled the Vocational Education Act of 1954.

Prediction: The bill will not be enacted in 1954.

This prediction, in turn, is based on the fact that no hearings have been scheduled for the Smith measure. And from all present indications the bill (S.3271) will require long study in Senate and House committees before it is sent on for a final vote.

From "Upstairs."—If the appelation "Smith measure" sounds strange to your ears, it is only one of several uncommon aspects about the bill one has to get used to. Who, you might ask, is the Smith whose name is now attached to the most important vocational-education measure in a generation? He is the distinguished chairman of the Senate Labor and Public Welfare Committee. By virtue of that fact alone—and not because of any special contributions to education—he was chosen by the Administration to introduce the bill, and history presumably will now recognize him as its author. But it should be remembered that the bill was conceived and developed in the Department of Health, Education, and Welfare. No vocational educators from the states were consulted before its writing. Nor was there any consultation with professional vocational organizations. And precious little consultation took place with the Office of Education on whether or not the bill should be introduced at this time. The bill came from "upstairs." The U.S. Commissioner of Education and his vocational men had to accept it and are going down the line for it.

Nor was there any attempt on the part of Secretary Hobby and her experts to seek the advice of men like Senator George and Representative Barden. These men belong to the party OUT of power. The party IN power saw no reason to ask for their opinion—at least, for the present. And for the present, too, these two men are withholding their views on the new measure. They will have plenty to say, however, when the Congressional committees begin taking testimony on the proposal.

There is still another fact to ponder about the Smith measure. It was introduced by an administration which has not yet demonstrated its devotion to the cause of vocational education. In fact, all its actions prior to the introduction of the Smith bill were tilted the other way. And it was introduced at a time when administration spokesmen are on record demanding cuts in vocational-education grants.

On the other hand, some observers describe the bill as a document of vision, unspoiled by partisan considerations. They point to the fact that the bill's formula for distributing the money will operate in favor of Democratic states. Thus Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, and Virginia will each receive more under the proposed S. 3271 than under the present Smith-Hughes and George-Barden Acts. These states, traditionally Democratic, have lower per-capita incomes and therefore will be entitled to more, for the formula for allotting funds (known as the Hill-Burton formula) favors the state where the people is but the money ain't. On the other hand, some of the large, rich states are slated for cuts under the formula. California, for example, would be slated for a cut of $170,000; Illinois, a cut of $157,000; Pennsylvania, a cut of $49,000.

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